RAILROAD GAZETTE

FRIDAY, AUGUST 21.

Interpretation of the Revised Rules for Interchange of Cars.

The last meeting of the Buffalo Master Car-Builders' Club held at Niagara Falls, Aug. 12, 1885, Vice-President Kirby in the chair, was devoted to the discussion of "The Proper Interpretation of the Revised Rules of Interchange in Points where they Differed from the Old"—Rule 12, as to the splicing of sills, being particularly referred to. The matter was thoroughly discussed by all members present.

Mr. WILDER, of the Erie, opened the discussion, explaining the new rule.

Mr. MARDEN, of the Fitchburg, was of the opinion that Rule 12 was more for the protection of the road owning the cars than for the guidance of inspectors at interchange points, the idea being that the roads owning cars should have the option of refusing their own cars when not properly repaired on foreign roads.

Mr. KIRBY, of the Lake Shore, advocated a more liberal construction of the rules, especially where they affected the dispatch of freight. It was shown that a number of the roads represented had cars with sills spliced at various points between the end sills and body bolsters. One or two of them had spliced their sills nearer the bolster than 12 in.

The result of this discussion was embodied in the following resolution:

"*Resolved*, That it is the sense of this meeting that in the interpretation of Rule 12 inspectors should pass all cars with spliced sills, excepting draw-sills, which are done in a workmanlike manner, if the indications are that the work has not been recently done, even if the splice does come nearer than 12 in. of the bolster. This opinion is given for the instruction of car inspectors, and not for the government of car repairers. In the repairs of cars, Rule 12 must be adhered to."

A long discussion then ensued on the subject of passing cars with defects which do not render the car unsafe to run, the prevailing sentiment of the meeting being that cards were not used frequently enough, and that freight was unnecessarily detained at interchange points, which should go forward with cards, provided the cars were safe to run.

Mr. MARDEN called attention to the large number of cars in service with defective brake-wheels, endangering the lives of train-men. It was decided that the rules, if lived up to, would remedy this evil.

Attention was called to Rule 17, as to running repairs on cars belonging to private parties, and several of the members wished to know who is responsible for the renewal of brasses and similar repairs made on such cars. In the discussion of this matter it was shown that there was a diversity of practice on different roads, some roads treating private cars the same as those of foreign roads, others charging all repairs to the owners of the cars. The unanimous opinion of the members present was that private corporations and owners of private cars should pay for all repairs, including the maintenance of brasses. It was decided to put Rule 17 rigidly in force on and after Aug. 1 of this year.

The committee on the formation of a permanent club was not ready to report. On motion it was discharged, and it was decided to let the matter drop. The meeting then adjourned to meet at the Tifft House, Buffalo, Sept. 15, at 9 o'clock a. m.

The Baltimore & Ohio Employes' Relief Association.

The following circular, recently issued by the Secretary, explaining the working of the savings fund and building features of the Association, will be of interest, although not new, being a repetition of the regulations of the Association as to these features:

It having been represented to the management of the Association that the Savings Fund and Building features, which have been in practical and successful operation since Aug. 1, 1882, are not fully comprehended by employés on certain divisions of the service, it is deemed advisable to issue this circular, setting forth briefly the practical advantages offered to employés by these features.

SAVINGS FUND.

Any employé in the service of the company, or his wife or children, may become a depositor, no matter whether he is a member of the Association or not, by simply obtaining from the Secretary, or any depositary of the Association, a blank form of application, properly filling up and signing it, and sending it to the Secretary, when a pass-book will be issued.

This book, and the money to be deposited, can then be presented to the nearest depositary, and the sum entered therein, after which the Baltimore & Ohio Railroad Co. becomes responsible for the safety of the deposit.

The Baltimore & Ohio Railroad Co. guarantees the absolute safety and the return of all deposits, with accrued interest. This offers greater security than any other savings institution in the country.

Deposits can be made in larger sums (not less than $1 nor more than $100 per day) than allowed by other savings banks.

No time need be lost or annoyance caused in making deposits, as depositaries are located at average intervals of 20 miles. These facilities will be increased from time to time, as the necessity therefor arises.

Interest at the rate of 4 per cent. per annum is allowed, which is generally greater than that given by other savings banks.

Money can be withdrawn on checks, as in any other savings bank, no matter where a depositor may be, with promptness and certainty.

Depositors participate in all profits earned by the operation of the Fund, being practically stockholders, without liability or any of the legal responsibilities usually attaching thereto.

Depositors are privileged to elect two-fifths of the members of the board of trustees, thereby fully protecting themselves against injudicious management.

BUILDING FEATURE.

Any employé of the company, who is a member of the Association, may become a borrower from this feature for the purpose of purchasing or improving his homestead, or releasing onerous liens thereon. These sums are loaned at the uniform rate of 6 per cent. per annum, interest being charged only on the net sum remaining unpaid at the end of each month.

Repayments are made at the rate of 1½ per cent. per month on each $100 borrowed, and the entire loan will thereby be repaid in about 85 months.

To Illustrate.—A. B. borrows $1,000; he would be required to repay 1½ per cent., or $15 monthly. The interest, at 6 per cent., would be $5 for the first month, so that he would have repaid $10 on the principal, as well as the actual interest. The second month he would only owe the interest on $990, which would be $4.95; but as he would continue to pay $15 that month he would be credited with $10.05 on the principal. In this way he would reduce both principal and interest, and, as above stated, the entire loan would be repaid in about 85 months.

Borrowers are required to take out such additional natural death insurance as will, with the amount they already hold in the Relief Association, equal the amount of the loan. The object of this is to secure the homestead in the possession of the family. In the event of his death before repaying the entire loan, so much of this additional insurance as might be necessary would be used to repay the balance of the loan, and the family would have the property free of debt and such amount of insurance as remained. No additional deduction from wages earned is required on this account, the monthly repayment of 1½ per cent. above referred to being sufficient to pay the principal, interest and the premium for the additional insurance within the 85 months.

All titles being examined by the company's counsel, there is reasonable certainty of securing valid titles in all transactions.

The full and complete use and possession of the property purchased by loans from the Association during the repayment of the loan enables the borrower to acquire ownership at about what he would have to pay for rent during the period.

The Association will supply material for the construction of houses at the lowest rates, which can be obtained by paying cash therefor and usually at large reductions upon local prices.

All material entering into the construction or improvement of homesteads is transported at half the usual charges.

Those leaving the company's service can continue their payments as heretofore, or can dispose of their interests to the best advantage, as can also those unable to meet their payments.

It is confidently anticipated that these matters will commend themselves to the practical attention of all employés, and that they will take advantage of the liberal opportunities herein presented of acquiring homes for themselves and families.

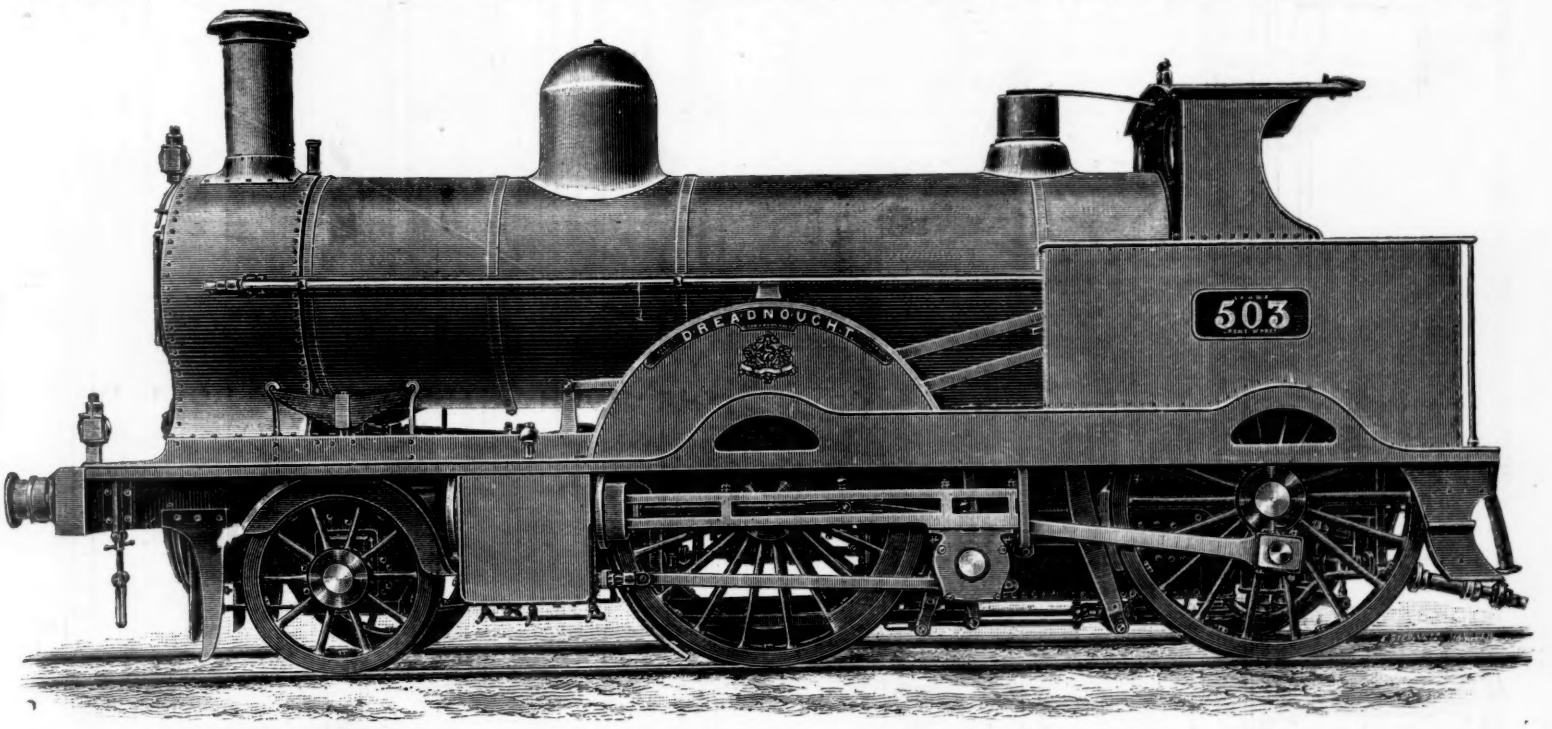
Any additional information on this subject will be most cheerfully furnished upon application to the Secretary of the Association.

The Compound Locomotive "Dreadnought."

The accompanying engraving represents one of the latest and largest examples of compound locomotives. The "Dreadnought" is now running heavy express trains on the London & Northwestern Railway, and was built at their works at Crewe, from the designs of the Chief Mechanical Engineer of the line, Mr. F. W. Webb. A sister engine, the "Marchioness of Stafford," is exhibited in the Inventions Exhibition now open in London, and deservedly attracts much attention.

An earlier and somewhat smaller engine of very similar design has been fully illustrated and described in these pages,* and therefore most of our readers will recollect the leading features of Mr. Webb's system of compounding locomotives. A brief description may, however, be useful.

The system on the London & Northwestern has hitherto been applied only to passenger engines with four driving wheels, in such a manner that coupling rods are dispensed with. Two high-pressure cylinders are used, and their pistons are connected in the usual manner to crank pins placed at right angles on the hind pair of drivers. These high pressure cylinders exhaust into a chamber or receiver, formed of



COMPOUND PASSENGER LOCOMOTIVE "DREADNOUGHT," WEBB'S SYSTEM, LONDON & NORTHWESTERN RAILWAY.

large pipes placed alongside the ordinary steam pipes in the smoke-box. The exhaust steam from the high-pressure cylinders is slightly superheated in passing through these pipes, and enters the steam chest of the one low-pressure cylinder. This cylinder is placed between the frames, and its longitudinal centre line coincides with the longitudinal centre line of the engine. The high-pressure cylinders are, therefore, outside connected, and the one low-pressure cylinder is inside connected.

The piston of this central low-pressure cylinder is connected to the cranked axle of what in ordinary engines are termed the main drivers, but in these engines might more properly be termed the "low-pressure" drivers. Each of the three cylinders—the two high-pressure outside cylinders and the one low-pressure inside cylinder—is provided with Joy's valve gear and ordinary locomotive slide valves, the valves of the high-pressure cylinders having the Allen passage. The low-pressure cylinder slide valve is placed above the cylinder, and the high-pressure cylinders have steam chest and slide valves beneath them. This plan permits the valves to drop off the face when the engine is running down long inclines without steam.

A locomotive differs in many important respects from marine, portable and stationary engines to which the compound system in various forms has been so successfully applied. Marine engines may work so as to give perfect satisfaction, and yet be unable to exert full power at starting or even to start at all in certain positions of the crank. A locomotive must always be able to start, and start promptly, in any position of the cranks, and is often called upon to exert its maximum pull at the very moment of starting. A little consideration will show that these requirements are not easily met by the compound system. It is evident that when steam is first put on, the low-pressure cylinder is entirely inopera-

* See *Railroad Gazette* for March 31, 1882 and Feb. 15, 1884. See also issue of Aug. 14, 1885, for an account of German compound engines. Various illustrated articles and notes will also be found in the volumes of 1881–5.

COMPOUND PASSENGER LOCOMOTIVE "DREADNOUGHT," WEBB'S SYSTEM, LONDON & NORTHWESTERN RAILWAY.

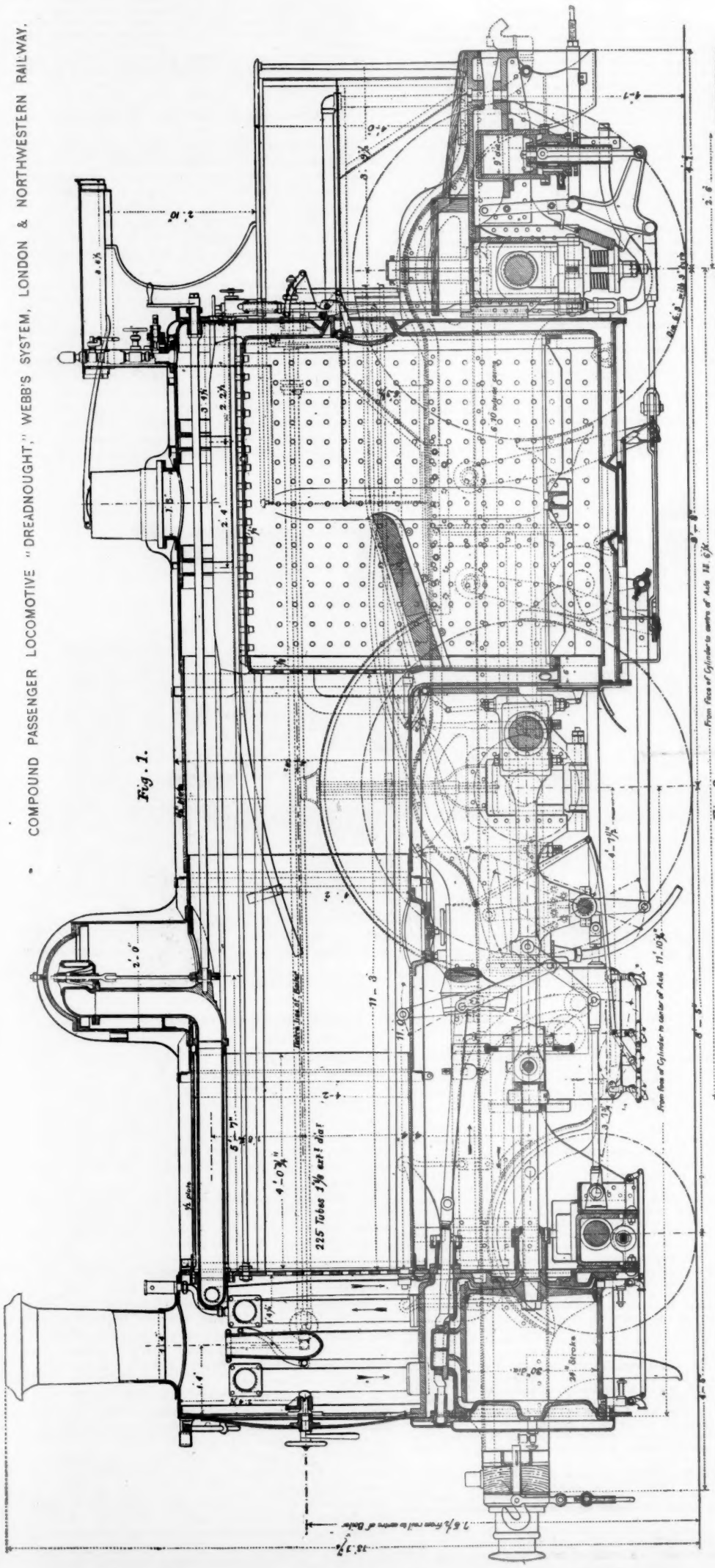


Fig. 1.
Scale.
225 Tubes 1⅝ ext.r diaf
4'-0¾"
30" Stroke
From face of Cylinder to centre of Axle 11'-10¾"
From face of Cylinder to centre of Axle H. & K.

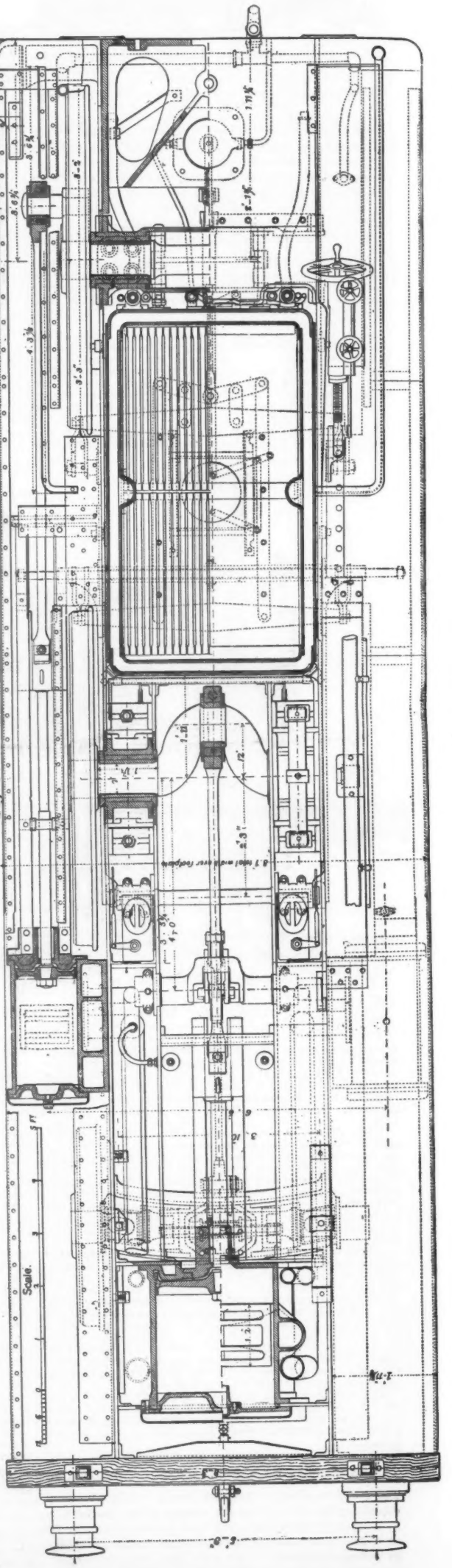
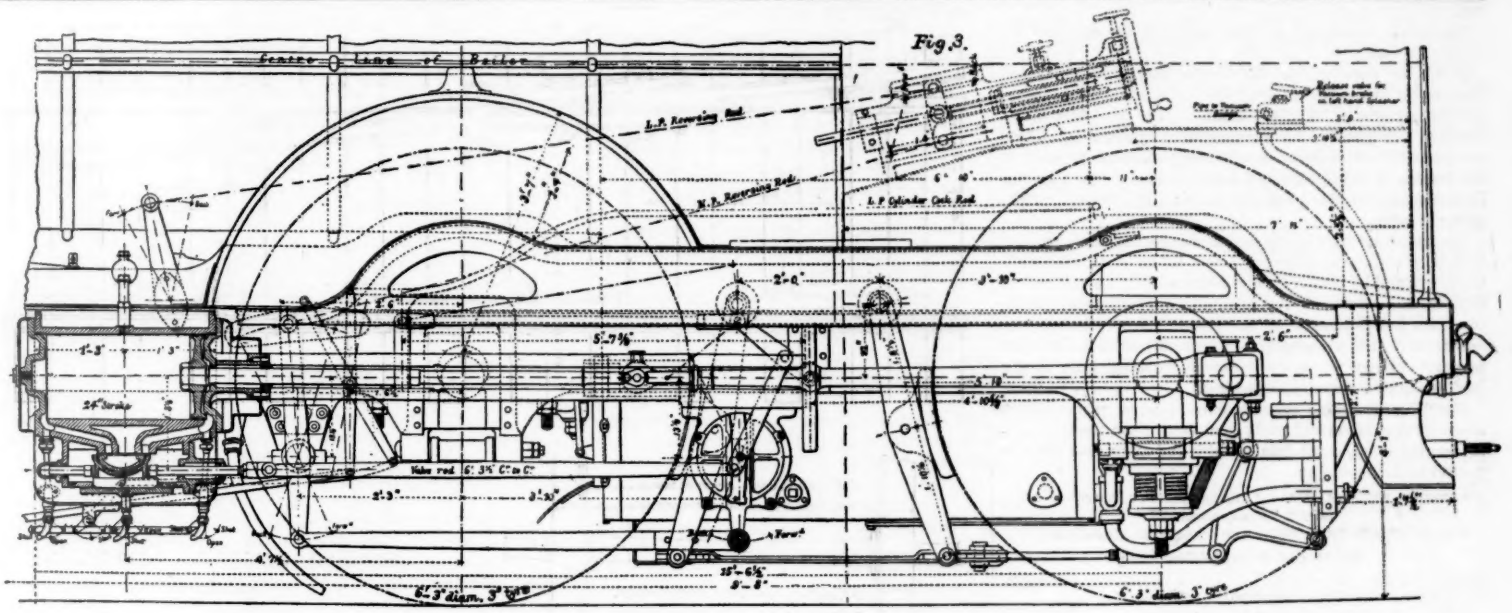


Fig. 3.



COMPOUND PASSENGER LOCOMOTIVE "DREADNOUGHT," WEBB'S SYSTEM, LONDON & NORTHWESTERN RAILWAY.

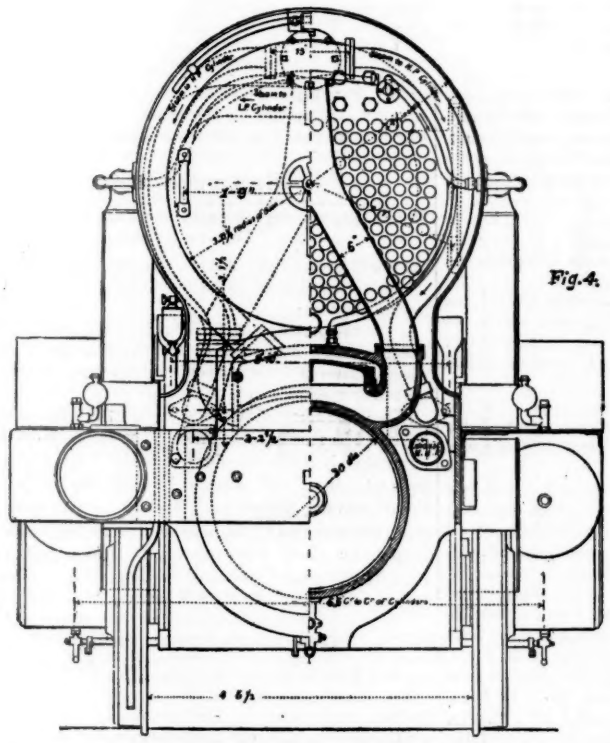
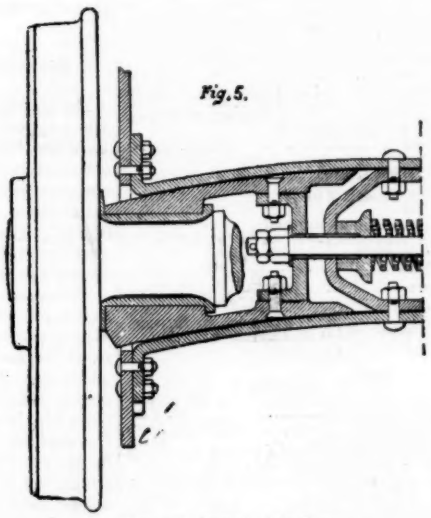


Fig. 4.

Fig. 5.



Plan of Radial Axle-Box.

tive, as it cannot receive any steam until one of the high-pressure pistons has made a stroke.

In another form of compound engine as applied to locomotives (that with two cylinders of unequal diameters),* this difficulty has been overcome by admitting the high-pressure steam to the low-pressure cylinder at starting, either direct from the boiler or through a reducing valve. This system has not been adopted by Mr. Webb, as he considers that it involves some additional complication, and the high-pressure steam acting on the large area of the low-pressure piston is liable to strain the working parts.

A small warming-pipe is therefore the only means provided for allowing the high-pressure steam to reach the low-pressure cylinder direct. A sufficient volume of steam to cause any appreciable effect in starting the engine can only reach the low-pressure cylinder by passing through the high-pressure cylinders, receiver, etc., as before described.

The cycle of operations, therefore, at the starting of the "Dreadnought," is somewhat peculiar If the tractive power of the high-pressure cylinders is sufficient to overcome the resistance and inertia of the train, it is virtually started by a pair of 14 × 24 cylinders acting on a single pair of 75-in. drivers. The tractive force calculated by the ordinary method is barely 63 lbs. per pound average pressure on the pistons. The boiler pressure is, however, no less than 175 lbs. per sq. in., and as during the first stroke of the pistons there is no exhaust steam, and consequently no back pressure, it is probable that an average pressure of 130 lbs. per sq. in. may be attained on the pistons, giving a total tractive power of some 8,000 lbs. at the moment of starting. In regular working the Dreadnought has taken a train weighing, with the engine and tender, 464,000 lbs. up a grade of 1 in 75 (70.4 ft. per mile) 5½ miles long in 10 minutes, and consequently might be called upon to start on this grade with an even heavier train. In this particular case, the resistance due to gravity alone is 6,186 lbs., and allowing 8 lbs. per ton for friction and inertia at starting, the total resistance at the moment of starting would be 8,042 lbs. This figure, which is probably too low, shows that the high-pressure cylinders unaided cannot be depended upon to start the engine under all circumstances, even when they are exerting a tractive force of nearly ¼ the insistant weight on the wheels, each pair of drivers being loaded with 33,600 lbs.

On starting the engine with a heavy train on a grade, or on a greasy rail, the hind or high-pressure drivers slip, and the engine remains stationary until the high-pressure pistons have performed a stroke or two, and have given the low-pressure piston a supply of steam. The low-pressure piston then lends its aid to start the train, and both pairs of drivers being now utilized, the engine then moves off. The low-pressure cylinder is provided with relief valves, which blow off at a pressure of 75 lbs. per sq. in., and so prevent any undue strain being thrown upon the large low-pressure piston or crank-axle, etc.

The tendency of the high-pressure wheels to slip at starting checks itself, as the slipping simply fills the receiver with exhaust steam, and correspondingly increases the back pressure on the high-pressure pistons. Thus the effective force on the high-pressure pistons is diminished until it is insufficient to slip the wheels.

If compound engines cannot be said to have passed completely through the experimental stage on the London & Northwestern, the experiment has at least been on a tolerably extensive scale. The 41 engines already built on this principle have already run 2,200,000 miles, a mileage nearly 20 per cent. in excess of the annual passenger train mileage on the Boston & Albany and nearly two-thirds of that of the Lake Shore & Michigan Southern Railway.

The average daily work of each compound has been about 234 miles, some engines having reached an average of 300 miles daily, which shows that the engines have not been much laid off for repairs or break-downs.

Through the courtesy of Mr. Webb we had an opportunity of riding on a sister engine to the "Dreadnought," and comparing her performance on regular trains with that of the ordinary express passenger engines used on the road. The compound engine hauled a train of fifteen vehicles weighing, with engine and tender, about 544,000 pounds, from Euston to Crewe, a distance of 158 miles, in 3 hours 34 minutes, including time consumed in two intermediate stoppages. The speed, including stoppages, is therefore 44.3 miles per hour, and without stoppages about 46 miles an hour, which is a very fair speed for a train providing accommodation for 350 passengers and their baggage, and hauled by one engine.

The engine steamed remarkably well, the pressure being easily kept steady at 165 lbs., seldom falling below 160 lbs., and only kept below the blowing-off point (175 lbs.) by the use of the damper and injector. The latter was kept on continuously, the amount of feed being regulated to suit the varying requirements of the boiler. The front damper was only open one notch for nearly the whole distance, but was occasionally assisted by a partial opening of a door in the centre of the bottom of the ash-pan or water-bottom. In passing through tunnels the almost entire absence of sparks was very noticeable. On the return journey with ordinary engines and a lighter train, the number of sparks emitted was greater, though in neither case did they fairly deserve the name, being always extinguished before they began to fall.

These good results are doubtless partly due to the care taken to reduce the quantity of coal burnt, especial attention having been given to this point on the London & Northwestern for many years past. The larger firebox and higher pressure of the compound as compared with the ordinary engines also contribute to their economical results as regards consumption of fuel. Mr. Webb informs us that the average consumption of the compound engines, hauling the heaviest and fastest trains on the line, is 29.1 lbs. per train-mile, or less than the average of all the passenger service.

The blast being derived from a single cylinder is infrequent, and each blast can be distinctly heard at the high speed. An engine with 12 ft. 6 in. driving wheels and the ordinary arrangement would make the same number of blasts at the same speed as the compound. As, however, the engine steams admirably with a fast heavy train, the slow blast does seem to have rather a beneficial effect than otherwise.

The large bearing surfaces of the engine are very noticeable, and should tend to reduce the frequency of repairs. The low-pressure axle has not only large bearings, as will be seen from our table of dimensions, but is made in such a manner as to remove the objectionable features of a weak axle. It is formed of a round bar, 8 in. diameter, bent into form in a hydraulic forging press. The throws are

* A compound locomotive on this principle was illustrated in the *Railroad Gazette* Jan. 11, 1884. See close of this article.

consequently as strong as other parts of the axle and not liable to break.

It will be noticed that the tender carries a very small quantity of water for runs of 90 miles without stopping, over long grades of 70 ft. to the mile. It is of course fitted with the pick-up scoop for taking water while running. These scoops and track tanks have been very extensively used on the London & Northwestern line for the last 25 years, having been invented by Mr. John Ramsbottom, Mr. Webb's predecessor in office.

The reversing gear of the engine enables the valve gears of both high and low-pressure cylinders to be reversed simultaneously and by one screw and hand wheel. The degree of expansion, however, in the high-pressure cylinders, can be regulated independently of the low-pressure cylinders, and *vice versa*. It is advantageous to cut off earlier in the low-pressure cylinder when the engine is running fast, as the back pressure is thereby diminished.

The "Dreadnought" presents several novel points which are deserving of careful study, and at a future time we hope to describe briefly some details which our space does not now permit us to touch upon.

DIMENSIONS, WEIGHTS, ETC., OF THREE-CYLINDER COMPOUND LOCOMOTIVE "DREADNOUGHT."

Fuel principally South Wales coal—smokeless steam coal.

Weight and General Dimensions.

Gauge of road	4 ft. 8½ in.
Total actual weight of locomotive in working order	95,200 lbs.
Total weight on each pair of driving wheels	34,600 lbs.
Total wheel-base	18 ft. 1 in.
Distance between centre of front and back driving wheels	9 ft. 8 in.
Distance from centre of main driving wheels to centre of cylinders ..... H. P. 14 ft. 3½ in.—L. P.	10 ft 6 in.
Length of main connecting-rod, from centre to centre of journals ..... H. P. 8 ft. 3 in.—L. P.	6 ft. 3 in.
Transverse distance from the centre of one cylinder to the centre of the other	6 ft. 5 in

Cylinders, Valves, Etc.

Diameter of cylinders and stroke of piston	2—H.P. cyls. 14 in × 24 in. 1—L. P. " 30 in. × 24 in.
Horizontal thickness of piston over piston head and follower plate ..... H. P. 2½ in.—L. P.	5 in.
Kind of piston packing	3 Ramsbottom rings.
Diameter of piston rod ..... H. P. 2⅛ in.—L. P.	3½ in.
Size of steam ports ..... H. P. 10 in. × 1⅜ in.—L. P.	18 in. × 2 in.
Size of exhaus ports.. H. P. 10 in. × 2¾ in.—L P	18 in. × 4¾ in.
Greatest travel on slide valves ..... H. P. 3½ in.—L P.	4 12-16 in.
Outside lap of slide valves ..... H. P. ⅞ in.—L. P.	1¼ in.
Inside lap of side valves ..... H. P. *nil*—L. P.	*nil*.
Lead of slide valves in full stroke ... H. P. 1/16 in.—L. P.	3 16 in.
Sectional area of opening in each steam pipe connected with cylinders	H. P. 7 sq. in.

Wheels, Etc.

Diameter of driving wheels, outside of tires	75 in.
Diameter of leading wheels	45 in.
Size of main driving axle journal, diameter and length ..... L. P. 7 in. ×	13½ in.
Size of other driving axle journals ..... H. P. 7 in. ×	13½ in.
Size of leading axle journals	6 in. × 10 in.
Size of main crank-pin journals ..... H. P. 4 in. × 5 in. L. P. 7¾ in. ×	5½ in.
Size of coupling rod journals	None.
Length of driving springs, measured from centre to centre of hangers. L. P. 2 ft. 4 in. × 4 in. wide. H. P. 4 spiral springs to each wheel.	

Boiler.

Boiler barrel	Telescopic
Inside diameter of smallest boiler ring	4 ft. 1 in.
Material of barrel of boiler	Bessemer steel.
Thickness of plates in barrel of boiler	½ in.
Horizontal seams	Butt seams, welded inside and outside and double riveted.
Circumferential seams	Lap seams, double riveted.
Material of tubes	Brass.
Number of tubes	225
Diameter of tubes, outside	1⅞ in.
Distance between centres of tubes	2 15-32 in.
Length of tubes, over tube plates	11 ft. 4⅝ in.
Size of fire-box, inside, length × width × depth from under side of crown plate to bottom of mud ring	74 in. × 40 in. × 80½ in.
Water spaces, sides, back and front of fire-box	2¼ in., 2½ in., 2½ in.
Material of outside shell of fire-box	Bessemer steel
Thickness of plates of outside shell of fire-box	½ in.
Material of inside of fire-box	Copper.
Thickness of plates in sides, back end and crown of fire-box	½ in.
Material of tube-plates	Front tube-plate steel, back tube-plate copper
Thickness of front and back tube-plates	¾ in ; ⅞ in.
Crown-plate stayed with	Girders and slings.
Diameter and height of dome	24 in. × 33 in.
Maximum working steam pressure per square inch	175 lbs.
Kind of grate	Ordinary plain bars.
Width of bars at top	1¼ in.
Width of opening between bars	5-16 in.
Grate surface	20.5 sq ft.
Heating surface in fire box	159.1 sq. ft.
Heating surface of the inside of tubes	1,118.1 sq. ft.
Total heating surface	1,277.2 sq. ft.
Blast nozzle	Single.
Diameter of blast nozzle	4⅜ in.
Smallest inside diameter of chimney	14 in.
Height from top of rails to top of chimney	13 ft 1¼ in.

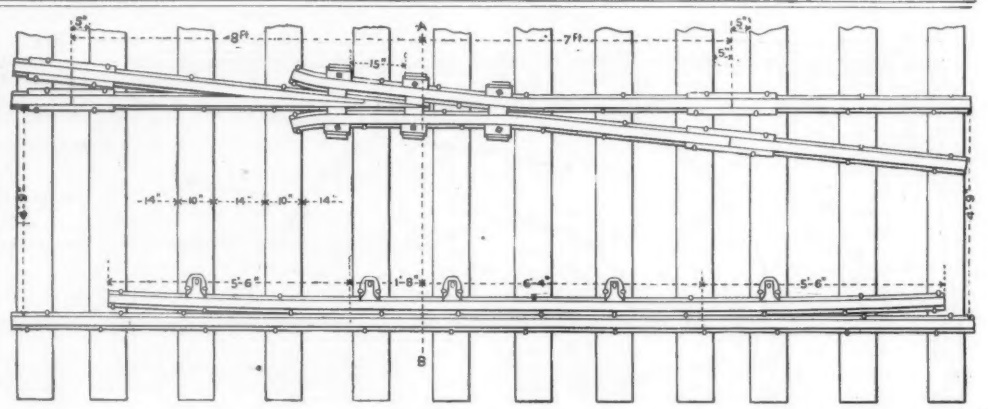
Tender.

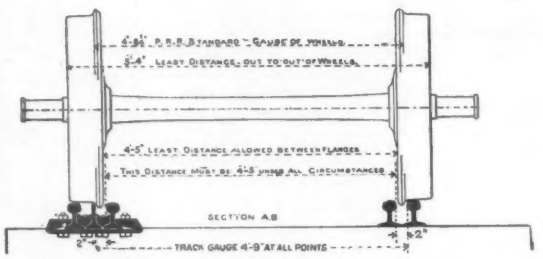
Weight of tender, empty	27,000 lbs.
Number of wheels under tender	6
Diameter of tender wheels	45 in.
Size of journals of tender axles, diameter and length	4½ in. × 8 in.
Total wheel-base of tender	12 ft. 6 in.
Distance from centre to centre of wheels of tender	6 ft. 6 in. × 6 ft.
Water capacity of tank (in gallons of 231 cubic inches)	2,160 galls.
Coal capacity of tender	11,200 lbs.

Engine and Tender.

Total wheel-base of engine and tender	39 ft. 3½ in.
Total length of engine and tender over all	44 ft. 11 in.

A noticeable advantage of the Webb design, as above stated, is the possibility of radiating the axles, since the drivers are not coupled. This is accomplished as shown in fig. 5, where it will be seen that the axle-box is a single casting, fitted at the ends with the brasses for the two journals. The box works between two curved guides, each formed of a flanged steel plate, these plates extending from frame to frame. Underneath the axle and within the box are placed two helical springs, one within the other, and coiled right and left-handed respectively, the movement of the box in either direction (it can move 1¼ in. each way) compressing these springs, which have abutments against cross-pieces connecting the two axle-box guide-plates. The arrangement has now been used by Mr. Webb on a large number of engines, and is found to act so satisfactorily that it is now being used on new passenger carriage stock.




4'-8½" P.S.B. STANDARD GAUGE OF WHEELS
5'-4" LEAST DISTANCE OUT TO OUT OF WHEELS
4'-5" LEAST DISTANCE ALLOWED BETWEEN FLANGES
THIS DISTANCE MUST BE 4'-5 INCH ALL CIRCUMSTANCES
SECTION AB
TRACK GAUGE 4'-9" AT ALL POINTS
2"

STANDARD GUARD-RAIL, PENNSYLVANIA RAILROAD.

Standard Guard-Rail, Pennsylvania Railroad.

The drawing herewith is published in correction of one which appeared in our issue of June 12, 1885, which, we have been informed by Mr. Wm. H. Brown, Chief Engineer, is not correct, being "taken from an old drawing which had been changed."

In writing to correct this error, Mr. Brown adds the following very interesting information as to the reason for the changes and the origin of the half-inch eccentricity of gauge on that line (4 ft. 9 in. instead of 4 ft. 8½ in.):

"The gauge on our road was widened from 4 ft. 8½ in. to 4 ft. 9 in., in order to afford a compromise between the Fort Wayne road and the Philadelphia & Trenton which were 4 ft. 10 in., and the main line of the Pennsylvania R. R., which was 4 ft. 8½ in. When this was done it became necessary to widen out our guard-rails and make the throat of our frogs 2 in. instead of 1½ in. wide, as had been the rule before that time; and, in order to prevent cars that were built for the 4 ft. 10 in. gauge from striking the point of the frogs, a limit of 4 ft. 5¼ in. was adopted as the least distance to be allowed between flanges. Since that time the 4 ft. 10 in. gauge has disappeared, and all of our roads are 4 ft. 9 in. between New York and St. Louis. In order to avoid the expense of transferring cars at the "Pittsburgh Transfer" (because the wheel gauge did not comply with the old standard), we had all guard-rails on our road placed 4 ft. 5 in. between the inside face of the wing-rails of the frog and the inside face of the guard-rail, still leaving the 2-in. throat in the frog and the 2-in. space between the guard rail and the main rail. This allowed us to receive cars at Pittsburgh that measured 4 ft. 5 in. between flanges and run them through without transshipment."

It will be noticed that the drawing specifies 4 ft. 5 in. as the "least distance allowed between flanges." The new standard of the Master Car-Builders' Association for this dimension is 4 ft. 5⅝ in., with an allowed variation of ⅛ in. each way. This same dimension was also shown on, and commented upon in describing, the drawing in our issue of June 12, and the coincidence would have removed all doubts, had any existed, as to the authenticity of that drawing. We do not understand the intention of the above expression to be in contravention to the Master Car-Builders' standard, nor to mean more than that, so far as the maintenance of way department is concerned, their guard-rails will be adapted to pass wheels only 4 ft. 5 in. apart in the clear *if necessary*. It is still open to the other operating departments to refuse cars having less than 4 ft. 5⅜ in. or 4 ft. 5¼ in. in the clear, nor is any real contradiction involved. To an inquiry as to this matter, Mr. Brown responds as follows:

"In regard to the distance of 4 ft. 5⅜ in. between flanges, this I believe has been adopted by the Master Car-Builders' Association, and it is also the practice on the Pennsylvania Railroad, but as we were only showing the details of track, we specified the *least distance* between flanges that would be received as 4 ft. 5 in. I do not think there is any probability of our going back to 4 ft. 5¼ in., as that alone has been the 'bone of contention' between the Western lines and our own for several years, and we have lately made the necessary alterations in our track to allow us to take cars that are 4 ft. 5 in., and I suppose it will be continued.

"You will notice on the new lithograph that we have not marked any standard gauge between flanges; this was omitted on purpose."

The differences between this drawing and the one previously published, except in the particulars above mentioned, are not great. The chief are that the standard gauge out to out of wheels was not given on the other drawing and that the length of the guard-rail throw was 20 ft. instead of 19 ft.

Contributions.

Responsibility for Wheels Broken or Cracked on Foreign Roads.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Will you or some of your readers kindly answer the following question:

Under the present "M. C. B." rules for the interchange of freight traffic, who is liable for the expense of replacing wheels removed from cars on foreign roads, on account of broken or cracked treads or flanges? M.

[The language of the rules (which has never been changed in this respect since there first began to be any rules) is perfectly clear. Rule 3 says that cars may be refused for wheels having the defects mentioned, among others, and, if they happen to be passed on to the road and fail, whether from the causes mentioned, or from any others, "under fair usage," Rule 8 says that "they will be *charged to the company owning the car*."—EDITOR RAILROAD GAZETTE.]

Shall the Owners Be Protected?

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention has been called to an article published in the *Railway Age*, entitled "The Purchase of Railway Supplies—a Charge that Corrupt Inducements Are Sometimes Employed."

This is a matter of grave importance, and merits more than a passing thought. If the interests of confiding investors are being sacrificed as indicated, investigations cannot be begun too soon, nor pushed too far. A Purchasing Agent of an important railway told me privately that the bribing of railway officials by means of presents or "commissions," to induce purchases from corrupt parties is a more widespread evil than outsiders suspect. Only last week a shrewd railway director informed me that they had just unearthed a case of this kind, where this criminal practice had been carried on for years, and the guilty official, when confronted with the testimony, restored a considerable quantity of ill-gotten gains, and thus a large leak was stopped on his road. How many such leaks are required to waste enough money to pay a dividend? The amount of the bribe represents but a small fraction of the loss of the railway company, for they not only have to pay the bribe, which is added to the price of the material, but must bear the endless loss entailed upon them by inferior quality.

The duty of railroad directors seems to be very plain in this matter. If, upon examination, they find purchases being made of parties in the habit of paying "commissions," rather than of honest parties dealing in the same line who scorn such practices, and never pay bribes under any name, what action should be taken? BONDHOLDER.

Piece-Work in Shops.

ELKHART, Ind., Aug. 14, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Aug. 7, I notice a communication by "W.," regarding the advantages of the "piece system" in railroad shops. Although not having a very practical knowledge of the system, it appears to me that in railroad shops, repair shops especially, the turning of tires is a very important matter. We have a man in the employ of the shops at Elkhart who has turned tires for as many as 15 years for the company, and in speaking to him in regard to the subject he gave as his opinion that it would be a very difficult matter to arrive at any satisfactory per cent. or average upon which to pay by the piece for such work.

We frequently have tires come to our lathes which are

"case-hardened" in spots, probably caused by the wheel slipping on the track, or more properly speaking, sliding on the track, after the brakes have been put on. We find that no tool will cut these hard spots, and they have to be chipped under (or out). Even a good Mushet tool will not cut them. Others come which are comparatively free from these hard spots.

It is true we could take an average of the wheels, but they differ so widely even in summer and winter, that we should have to change the average once in six months, at least, to make an approximate fairness.

Again, in most shops (particularly old ones) the machines differ greatly, and the man who is fortunate enough to get a good machine to work on will have a great advantage over his neighbor who may not be as fortunate in obtaining good tools to work with; consequently, he will turn out more work than his neighbor, and of course get more pay, not through any more work on his part, but through the difference in the machines.

Still another argument presents itself to me, viz.: Men employed by the piece system soon acquire the very natural idea that they are paid for the quantity (instead of the quality) of the work they do, and perhaps try to do more work in a given time than they otherwise would.

Granting this, will they do as good work as they would in the present system of labor? Would not the desire of gain make them slight their work unless watched over by some superior? And even then it would be difficult to prevent it entirely. Even with the present system, the work is not done any too well, and certainly the piece system would not improve it any.

These are a few arguments which suggest to me the evils of the piece system. If I am in the wrong, I should be pleased to be set right in regard to the subject. R. NEWELL.

Rotary Locomotives.

SHARPSVILLE, Mercer Co., Pa., Aug. 15, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see in the "Technical" column of the *Gazette* of Aug. 7 your statement to the effect that A. L. Harris and W. C. Shearer, of Atlanta, Ga., have taken out a patent for "an entirely new style of locomotive," the motor in which is a rotary engine connected directly with the main driving-axle.

The rotary engine devised by the persons named is, perhaps, in form and capacity for service in a locomotive, something new and useful; but the idea of driving a locomotive by means of a rotary engine is not new.

Mr. Baldwin, the founder of the establishment everywhere known as the "Baldwin Locomotive Works," was, probably, the originator of the idea; at any rate the idea came to him and for a long time so entirely occupied his mind that he neglected projects for improving the reciprocating engine, devoting his attention to the "rotary," that was, in his opinion, to supersede the other form. He spent much more money than he could well spare in experiments aiming at the production of an effective rotary locomotive engine, but finally desisted without having accomplished his object.

I do not know that any account of Mr. Baldwin's efforts in the direction above indicated has ever been published; but there are many persons, some of whom are now connected with the Baldwin Works, who have personal knowledge of the long-continued experimental work above mentioned.

Since the time of Mr. Baldwin's essays the idea of applying a rotary engine to the driving of a locomotive has had independent development in several, and perhaps many, minds: but a "rotary" *better*, for the purpose in question, than the engines now in use, has not yet appeared and approved itself to the judgment of mechanicians. That fact, however, argues but little except that those attempting to produce such a rotary have persistently followed the lead of the earliest inventors in the "rotary" line, and have directed their efforts to the overcoming of certain inevitable and practically insuperable difficulties therein encountered; whence comes persistent production of engines, each having the "constitutional" weaknesses, in consequence of which rotaries heretofore produced cannot successfully compete with the engine now used in locomotives. The insufficiency of rotaries heretofore produced affords no ground for arguing that an efficient rotary is an impossibility.

I have demonstrably tenable ground for asserting that a rotary may be made that will perform the work demanded of a locomotive engine; and that, while largely more effective, will cost much less, both as to prime cost and maintenance, than the engines now used.

Some years ago, following the original idea of a rotary, as others have done, I devised a machine of the class in question, the leading feature of novelty in which was the introduction of steam directly to the central interior of the piston chamber, through the shaft of the engine, made hollow for that purpose. Some time thereafter another person conceived the same idea, and acted upon it, with good results. With revived interest in the subject I then undertook to make further improvements in the rotary. Reviewing the whole matter, I discarded all earlier work, and eventually developed a very simple contrivance whereby the difficulties met, as aforesaid, in the old line of essay, are effectually *avoided*. In passing, I may say that in the contrivance to which I refer the operation of "reversing" is strictly simple; steam may be worked expansively, as in any reciprocating engine; the "buttress" is as positive as the head of a cylinder; and the appliances for performing the duty that packing-rings and like devices perform in an ordinary cylinder are not more complicated nor costly than are such packing-rings, etc.

I have sent for copy of specifications in the patent of Messrs. Harris and Shearer, and shall be pleased if I find that they are on the right track. J. M. GOODWIN.

The Cause of Breakage of Angle-Bars.

PITTSBURGH, Pa., July 21, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In my communication on "Rail Joints," printed in your issue of July 10, 1885, I am made to say that, "I hear it stated that the beveled joint is giving very good results," etc., whereas what I wrote and meant is, "*the bridge* (Fisher) *joint.*" The subsequent remarks have no meaning in connection with a beveled joint, but solely apply to the bridge joint. Your comment, then, on the beveled joint was based on a misprint.

I readily believe your statement as to the failure of beveled joints. It agrees with my own knowledge of their failure in Germany and in this country. But there is this important difference, that they have all been tried with fish-bars or angle splices, whereas I suggested their use only in connection with the bridge joint as a means for using 60-ft. rails. They have not been so used yet to my knowledge. Actual trial with that combination may show whether it would be a success or failure better than mere arguments.

Your statement as to freight trains in England being faster than in America I accept as a qualification rather than a correction of what I said. I spoke of European freight trains. The English railroads are but a fraction of the European railroad system. The Continental freight trains run slow enough to bring the average far below the American average.

So, too, I am aware of the repeated comparisons of the effect of larger and smaller wheels with no decided advantage for larger wheels. But who will say that the present universal practice of rigid wheel-pairs will remain so forever? I think it possible to have a truck in which each wheel turns independently. The question whether the cost and maintenance is necessarily so much greater that it would amount to more than the saving in train resistance is yet to be tested. I have no reference to patented devices of this class, which have been proposed and tried. Some of them are nonsensical on their face.

Could Maud S., if driven in a sulky with the wheels fixed on the same axle make as good time as if the wheels turned independently? And could she make as good time in a sulky with 3 ft. wheels as with 5 ft. wheels?

In your comment on even and broken track-joints, the standard of the Michigan Central is cited as proof of the possibility of spacing the joint-ties closer together with broken joints. I am aware of other roads having the same practice. Perhaps I had not been explicit enough, though probably I might have been given credit for comprehending the possibility of such practice. It has nothing to do with what I suggested—namely, putting the ties closer together *toward* the ends of the rail, for example, 32 in. centre to centre of tie at middle of rail and gradually getting less down to 20 in.; with 12-in. joint-ties 18 in. apart between centres, so that it would yet permit of tamping. Distances centre to centre of tie, for instance, marked off on a stick 30 ft. long. *Such an arrangement is evidently not practicable with broken joints*, unless the ties would rest under the rail at all sorts of angles except a right angle.

A valid objection to spacing the ties as suggested would be the difficulty of having it carried out, for precept and practice differ nowhere more than in track work. For instance, it is not infrequent to find the ties very irregularly spaced on first-class railroads. Not only are the broadest ties not selected for the joints, but the angle-bars rest sometimes only with one end on a small tie. With the steady improvement in track supervision, precept and practice may ultimately be made to agree, and then the experiment with ties spaced as suggested above may be tried. It is nothing new, and has been practiced on some German roads years ago with good results.

The effect of the rolling wheels is a peening or upsetting of the rail. Assume the contact area of wheel on rail as 2 in. × ⅛ in., equal to ¼ square inch, bearing an average load of 6,000 lbs. (but sometimes 24,000 lbs.). This load is applied in the form of an infinite number of blows, straining the metal in the rail top above its elastic limit. The effect, besides abrasion, is a lengthening of the rail top. The rails commence to curve down, even where the road-bed is rigid, as on bridges and elevated railroads.

Any mechanic knows that an 8-in. iron shaft can be straightened with a light hand hammer, if the blows are only often enough applied and well directed, and that the operation will be quicker on a rigid anvil than on a wooden block, and quicker on than between wooden blocks.

The greatest amount of curving of a rail can be obtained by curving the middle; therefore lessen there the amount of peening (which in general is unavoidable) by placing the ties further apart.

This is an effect aside from the action of the rail as a continuous beam. At the middle of the rail the bending moment between ties is counterweighted, so to speak, by nearly half the length of rail; this counterweighting decreases toward the end of the rail, increasing, therefore, the bending moments between the ties, unless these ties are placed closer together toward the rail ends.

As one fact is always worth more than a shipload of argument, I suggest again to try first and decide afterward.

Your statement that the slightly increased support to the middle of the opposite rail by the closer joint-ties of the other rail is rather an advantage than a disadvantage appears plausible; so does the fact that if a girder is built for a 40-ft. span, a trestle support at its middle will make it stronger, and therefore it will be an advantage to have one.

But who will regard this as correct reasoning?

G. LINDENTHAL, C. E.

[Mr. Lindenthal is a bridge man. Would he seriously propose, if he had a rolled girder of uniform section 100 ft. long to be supported (and requiring support) at 10 points, to scatter those supports at irregular distances apart, greatest at the middle and growing less toward the end, for its entire length? To try first and decide afterward is well, provided apparent reason for the trial exists, but to try experiments for which good *prima facie* reasons for a hopeful result do not appear is not well; and there appears to be a lack of such reasons for the proposed method of spacing ties and for the use of much larger wheels for freight service as well as, very decidedly, for the use of loose wheels. The reasons why the spacing of ties which broken joints require appears to be rather advantageous than otherwise was given in our discussion of "The Argument for Broken Joints" (Jan. 30—Feb. 20) which Mr. Lindenthal does not seem to have had in mind.

The suggestion to the constant pressure of wheels upsetting or "peening" the rail-head so as to make it longer and give the rail a tendency to curve vertically seems a reasonable one and would fit in very well with the behavior of rails at joints. Unfortunately, the facts seem against the theory, as rails when released from the track are, to the best of our recollection and belief, as straight as an arrow, which could hardly occur if the parallel with the effect of light hammer blows on iron shafts were a true one.—EDITOR RAILROAD GAZETTE]

THE SCRAP HEAP.

Railroads Then and Now.

Notwithstanding the boasted progress that this country is making in the march of improvement, it must be admitted by even the most boisterous boaster that an exception to the general advance is found in our steam cars. Very young persons, or persons who are new to traveling, may find much of comfort in our modern railroad coaches, and, therefore, satisfaction; but this satisfaction is born rather of ignorance of the lost comforts of other days than of enjoyment, *per se*, of the alleged comforts which have taken their place.

In that good old time—nevermore, alas! to return—when one entered a car his eyes were not blinded by the light of the sun by day nor dazzled by the glare of countless artificial illuminators by night. Night and day the car—an honest interior, suggestive of the straight-backed and geometrically correct pews and severely plain walls and ceiling of an early New England meeting-house—was pervaded by a dim religious light, quite in keeping with the general atmosphere of solemnity which surrounded him who took his life and his carpet-bag in his hand, and committed himself to the uncertainties and perils of the rail.

There were no soft, effeminate cushions in those grand old days; no cunningly contrived easements to back and body and legs were imposed upon the traveler, to rob him of his manliness and his energy and his powers of resistance; everything was constructed upon heroic principles; everything was so ordered that even death, at any time likely and at all times probable, was robbed of half its terrors, and oftentimes looked upon with complacency, if not with longing.

The windows were not the great hulking affairs of the present day, but were compact to a superlative degree, and while being intended apparently to let the inside light out rather than to let any outside light in, they possessed the added excellence of making the protruding of heads a difficulty, if not an impossibility. Hence numerous fatal accidents that otherwise might have happened were prevented, and when an occasional arm was knocked off, the unfortunate sufferer's eyes were veiled from the distressful scene.

To be sure, the windows did not admit of a thorough enjoyment of the passing landscape; but this is not to be expected in railroad traveling; at all events, and very fortunately, it was not expected in those happy days. In lieu of the fleeting interest of the exterior world, however, the railroad traveler had something far more engrossing inside. We refer to the mirror which inevitably graced either end of the rail car, and by means of which one might contemplate his personal beauty by the mile, and through whose instrumentality flirtation was rendered easy and unavoidable. Who can say how many happy marriages are not directly traceable to those dear old looking-glasses which are so rapidly passing away? Statisticians, in looking about for reasons for the regular falling off in the annual matrimonial crop, should not forget to consider the waning influence of the steam-car looking-glass.

And the stove. What a pleasure it was to hear the wood crackling and snapping, and to see the glowing cheeks of the honest old stove, as he sat sedately and without ostentation in the centre of the car, blushing in rustic self-consciousness at being the cynosure of every eye and the wished-for Mecca of successive rows of shivering passengers, from those in the remotest and most frigid corners of the car, even to these who sit, freezing, but one seat removed! It was hot enough, goodness knows, to the favored passengers whose seats abutted immediately upon the stove, but why there should have been heat nowhere else must ever remain a mystery. There was no hole or crevice through which the heat might escape, and no crevice or hole through which the outside air might come in as an adulterant of the caloric; still was the heat concentrated in one place and the coolness elsewhere disseminated. Hence it will be seen that there were two distinct climates in each car, instead of the monotonous temperature of this day of heaters and kindred abominations.

Space fails us, or we should like to speak at length of those dear old hand-brakes, which gave one, when approaching his station, such a jolly stirring up and never let up until he was landed wide awake on the platform. We should like to speak, also, of the old-fashioned coupling, and the pleasant sensation which always accompanied the starting of the cars—the train moving in detachments, like the sections of a spy-glass, one section at a time—and of many other well-remembered luxuries. Our endeavor has simply been to prove that our railroads are not now what they were once. If we have succeeded in doing this, we are content.—*Boston Transcript.*

Trunks that Were Not Smashed.

Baggage Master's Assistant (at Grand Central station)—Here are 15 pieces for Saratoga.

Baggage Master—Well, hustle 'em in lively.

Baggage Master's Assistant—They're all marked "V."

Baggage Master—Be careful of 'em, my boy; be careful of 'em. We've got plenty of time.—*New York Sun.*

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE EFFECT OF RATES ON TRUNK LINE SHIPMENTS WESTWARD.

In 1881, the year of prolonged railroad war, eastbound rates were reduced to a very low point in June, but west-bound rates, though somewhat demoralized in July, were not openly and generally reduced till Aug. 6. Immediately there was a great increase in shipments, the total shipments from New York in successive months having been:

	1879.	1880.	1881.	1882.
January	52,503	85,988	79,402	109,742
February	58,198	90,498	81,375	120,089
March	74,245	98,232	108,673	167,615
April	70 960	84,5 0	99,057	161,492
May	62.024	78,350	83,970	135,030
June	50,468	72,444	85,943	126,600
July	52,904	78,193	73,114	79,464
August	67,333	92,042	120,886	115,862
September	82,484	99,480	141.174	115,156
October	86.091	86,857	142,474	118,840
November	91,592	82,002	114,592	79,599
December	82,418	74,059	113,801	75,685
Year	831,219	1,022,646	1,242,461	1,405,174

These figures are intelligible only when we know the history of trade and of rates. Trade, which seemed to have reached the extreme of dullness in 1877, did not largely increase until the last half of 1879. Exports became large, but the country was very economical in its purchases. In the first and last half of the year the New York shipments were:

	1877.	1878.	1879.	1880.
First half		354.938	368,398	510,011
Last half	389.341	385.610	462,821	512,635

No record was made until July, 1877. We see that the shipments were nearly the same in the first half of 1878 and 1879, and the last half of 1877 and 1878, but that in the last half of 1879 they were a fifth greater than in the corresponding half of the two previous years; while in the first half of 1880 they were more than a third greater than in 1879 and 1878. That is, the "boom" began in the last half of 1879, and from its beginning the demand for merchandise increased enormously, and has never fallen back to the old figures.

Now what can it have been the consumption of which increased so greatly in the last half, or, more definitely, in the last four months of 1879? (September to December, inclusive, 1878, 254,363 tons; 1879, 342,585 tons.) We could hardly expect such an increase in dry goods, groceries, etc., the ordinary staples of New York trade. If we examine the shipments *by classes*, we shall see that the increase in first-class freight, which includes nearly all dry-goods, was comparatively not great, being in the last half of the year:

1877.	1878.	1879.	1880.
111,592	112,038	128,976	136,463

Thus, while the total shipments of the last half of 1879 were a fifth more than in 1878, the shipments of first-class goods were but 15 per cent. larger. Nor was there a large increase in the second, third or fourth class. Of the whole gain of 77,211 tons over 1878, no less than 62,294 tons consisted of a special class, including scrap iron, old rails, steel blooms, and a few other articles, which we began to import in great quantities in the fall of 1879, and forward to interior iron works, where they were manufactured to supply the sudden great demand, which, in a few months, raised the price of steel rails from about $45 to $80 per ton. This demand continued until the stocks of the world were exhausted, making a very large addition to the shipments of New York in 1880 and 1881.

Activity in business having fairly begun in the last half of 1879, the shipments grew moderately until the reduction of rates in the summer of 1881, being in successive half-years:

	1879.	1880.	1881.	1882.
First half	368,398	510,011	536,420	820:568
Last half	462,821	512,635	706.041	584,606

The rates were reduced Aug., 1881, and shipments did not increase materially until that month, in July being less than in 1880; but following the reduction of rates there was immediately a very large increase, the August shipments in 1881 being 31 per cent. more than in 1880, and, as we see above, those for the last half of the year being 37¼ per cent. more; while if we date from August, when the reduction began we find 434,442 tons shipped in the last five months of 1880, and 632,927 tons (46 per cent. more) in the corresponding five months of 1881. Where could this increase come from? The country for two years had been very prosperous and had made very liberal purchases. How could a reduction in rates which did not amount to 1 per cent. of the value of most goods have such an effect on consumption?

It did not. It simply drew away certain shipments, mostly of coarse goods, from the canal and from some very indirect water and rail routes, and turned them over the trunk lines. As evidence, we compare the shipments of the different classes of freight for the last five months of the year in different years:

	Class.				
Year.	1.	2.	3.	California.	4 and lower.
1877	100,118	24,967	16,595	13,138	103,846
1878	97,683	21.176	18,533	10,920	180,871
1879	112 878	28,285	21,176	12,923	234,656
1880	119,030	29,304	22.310	18,133	245,665
1881	141,501	37,582	31,838	18,065	403,741
1882	128.902	34 831	26.634	19,011	296,240
1883	123,063	31,192	23,997	7,812	241,964
1884	119,529	31,158	21,236	8,116	263,586

The totals for the five months being:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.
348,654	329,184	409,917	434,442	632,927	505,142	428,033	451,625

Thus the increase following the reduction of rates was confined chiefly to the fourth and lower class goods. The canal takes some domestics (first-class), but generally the coarsest freight only goes by water. So we see that, while the total shipments in these five months increased 198,485 tons (46 per cent.) from 1880 to 1881, the increase in fourth class or lower was 158,076 tons, or four-fifths of the whole increase. That there was a growth of traffic unaffected by rates is indicated by the fact that in 1882, after rates had been restored, the shipments were 16½ per cent. more than in 1880. Allowing for this, we find only about 90,000 tons of the increase in 1881 over 1880 due to the lower rates.

Now this increase is not more than could naturally be expected as a diversion from the canal and other slow routes. It was much larger at New York than at other eastern ports, Baltimore, Philadelphia, Boston and interior New England together shipping but 70,000 tons more in the last five months of 1881 than in the corresponding months of 1880, and only 9,000 tons more than in 1882, after rates had been restored.

We find further confirmation of this conclusion in the course of shipments this year compared with last. A reduction of nearly one-third was made in the rates last January, and a further reduction June 1. The result has been that in this year of bad trade the total shipments down to June 30 were 579,046 tons, against 595,125 last year. But the shipments of the several classes were:

	1.	2.	3.	4.	5.
1884	143,641	47,964	21,404	206,717	163,068
1885	137,553	42,505	21,657	171,514	199,242

Thus there has been a considerable decrease this year in the shipments of the more valuable freights, in spite of the lower rates, and the whole increase has been in the freight of lowest class, including sugar and molasses, much of which usually goes by canal, and of the 36,174 tons increase in this lowest class, no less than 22,306 tons were gained in May and June, after navigation opened.

Thus everything goes to show that the increase in the total traffic due to a reduction in west-bound rates is very small. The direct trunk lines may carry much more at such rates, as in the last half of 1881 and especially in the first half of 1882, when rates were still lower, but what they gain is almost all taken from the canal and the indirect rail routes, and nearly all of it is low-class freight which even when rates are maintained adds very little to the earnings and still less to the profits. Thus at *last year's rates* the earnings from each class of traffic during the June half-year this year and last (New York to Chicago) would have been:

	Class.				
	1.	2.	3.	4.	5.
1884	$2,154,615	$575,568	$192,636	$1,447,019	$815,340
1885	2,063,295	510,060	194,913	1,200,598	996 210
Increase			$2,277		$180,870
Decrease.	$91,320	$65.508		$246,421	

This gives an aggregate decrease of $220,102, or 4¼ per cent., in what we may call the "normal value" of the traffic after it had been stimulated by a great reduction in rates, but had decreased in quantity 2¾ per cent. But the actual rates this year produced (New York to Chicago) only the following earnings:

Class.					
1.	2.	3.	4.	5.	Total.
$1,331.567	$326,058	$126.086	$818,328	$694,281	$3,296.330

Compare these with the earnings from the traffic in 1884, and with the earnings that last year's rates would have given on this year's traffic. The receipts from the whole business, only 2¾ per cent. less tons than last year, were $3,296,330, against $5,185,178 last year, a decrease of $1,888,848, or 36 per cent. The reduction of one-third in the first-class rate during the first five months of this year did not prevent a decrease of 7½ per cent. in the first-class shipments, and the decrease of 47 per cent. in the first-class rate in June, when business could be taken from the canal, caused an increase of only 2,764 tons (14½ per cent.) in the first-class shipments; and though the *tons* of fifth-class shipments increased 22 per cent., the fifth-class *earnings* decreased 15 per cent. Thus in every way the reduction has been disastrous to the railroads, while it has also hurt the canal business.

Without a doubt the rail shipments have been increased by the low rail rates; and the condition of trade was such that there would have been a greater reduction in shipments than has actually occurred if last year's rates had been maintained. But the experience of more prosperous years justifies us in believing that the total rail and water shipments have been very little increased by the low rates, and the records themselves show plainly that such freight as has been diverted to the trunk lines by these rates was chiefly of the lowest class, and most of it doubtless would have been secured if rates had been maintained on the three upper classes, and reduced only on the fifth or the fourth and fifth.

A study of this subject was suggested by the fact that the low rates of the railroad war of 1881-82 were accompanied by an unexpected increase of traffic—so very large as to lead some to suppose that lower rates than had theretofore prevailed would increase profits. There is nothing to support this view. It may very well pay to make very low rates, even as low as the present fifth-class, on certain special freights which the railroads cannot otherwise secure; but the consumption of the great bulk of merchandise shipped from the seaboard will scarcely be affected at all by a reduction from the regular rates of the past few years (ranging from 75 cents for first-class down to 25), as was reasonably to be expected because the cost of transportation makes but an infinitesimal part of the price the consumer pays for such goods.

New York Grain Receipts in July.

The receipts of grain and flour at New York in July in each of the last eleven years have been, in bushels:

Year.	Bushels.	Year.	Bushels.
1875	7.930,198	1881	17,469,831
1876	10.057,826	1882	8,575,988
1877	6,230.049	1883	9,638,168
1878	11,043 993	1884	9,630,093
1879	14.821,588	1885	8,778,017
1880	21,128,865		

Thus the total receipts this year were smaller than in any other July since 1877, except 1882, and nearly as small now following a total grain crop of 2,970 million bushels, as in 1882, following a grain crop of but 2,034 millions, and this in spite of water and rail rates equal to the very lowest ever known. The receipts this year were but about half as great as in 1881, and 60 per cent. less than in 1880.

The bushels and percentage of the whole (grain and flour) brought to New York *by the railroads* in July in these several years have been;

Year.	Bushels.	P.c of total.	Year.	Bushels.	P.c. of total.
1875	3,698,067	46.6	1881	11.821,431	67.6
1876	5,083,439	50.5	1882	5.502 758	65.6
1877	1,733.095	27.8	1883	3,862.423	40.1
1878	5.365,107	48.6	1884	5,110,64e	53.1
1879	8,757.397	59.0	1885	5,216,368	59.4
1880	9,433,891	44.7			

But as the canal does not carry flour, we will give below the bushels and percentages of the total grain, excluding flour, brought by the railroads:

Year.	Bushels.	P.c. of total.	Year.	Bushels.	P.c. of total.
1875	2,313,476	36.7	1881	9,774.092	64.0
1876	3,786 668	44.3	1882	3,879,476	59 0
1877	931.450	17.9	1883	2,209 952	28.0
1878	4,013,659	42.6	1884	3,303.765	42 6
1879	7,069,776	54.4	1885	3,145,879	47.2
1880	7,679,785	40.0			

Thus the railroads had a larger share this year of the

total grain and flour receipts than in any other except 1881 and 1882, and carried a little larger quantity than last year. But this was due to the fact that flour made an unusually large part of the total receipts, and if we take the receipts of grain alone, for which the canal competes, we find that though the railroads brought a larger share this year than in 1884 and 1883, they brought a smaller share than in 1879, 1881 and 1882, notwithstanding their unprofitably low rates, and a smaller quantity than in any other year of the 11 except 1875, 1877 and 1883.

As there were more railroads to carry the grain this year than in the years of large receipts, the decrease by the old lines is more important than the above figures indicate, though an exceptionally small part of the business was done by the new railroads last July. For the last three year, and for 1880 (the year of largest July receipts) the receipts (including flour) by each railroad have been :

	1883.	1884.	1885.	1880.
N. Y. Cen.....	1,134,955	1,698.051	2,037,685	4,926,958
Erie	1,534,446	1,655,595	1,679,412	3,226,378
Pennsylvania...	923.492	920,291	688,364	1,262,005
Lacka	241,948	300,098	289,732	.. ..
West Shore.....	.....	485 000	474,749	.....
Oth-rs	27,582	51,613	46,246	18,550
Total rail.....	3,862,483	5.110,648	5,216,368	9,433,891

Compared with last year there is an increase of one-fifth by the New York Central; the Erie, the Lackawanna and the West Shore brought nearly the same both years, and the Pennsylvania brought one-fourth less, and there was an increase of 2 per cent. in the total rail receipts. Compared with 1883, there is an aggregate gain of 1,354,000 bushels, of which the New York Central made 902,700, the Erie 145,000, the Lackawanna 48,000, and the West Shore 475,000 (not being open in 1883). This year was the one when, the Chicago & Atlantic having just been opened, the Erie was engaged in demonstrating its ability to command a large share of the traffic.

The comparison of this year with 1880 shows the following decreases by the old railroads :

	N. Y. Cen.	Erie.	Penn.	Total.
Bushels.....	2,889,273	1,546,966	341,714	4,217,523
Per cent	58.6	48.0	27.0	44.7

When we consider that the Chicago-New York grain rate was 30 cents per 100 lbs. in 1880 and 13 to 20 cents, but only a short time 20, this year, we can see that a very serious decrease of profits has occurred in this one traffic. Indeed, it is not probable that there was any profit on it last July, while in 1880 it probably yielded more than $1,000,000, more than half of which went to the New York Central.

In successive years the percentage of the total rail receipts brought to New York in July by each road has been :

	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
N. Y. C..	58 5	60.4	58.2	52 2	45.4	36.6	29.4	33.2	39.1
Erie	30.4	21.3	24.7	34 2	33 9	31.6	39.8	32.4	32.2
Penna..	10 5	17.9	17.0	13.4	20.4	30.9	23.9	18.0	13.2
Lacka..		....	....	....	....	....	6.2	5.9	5.5
W.Shore		....	....	....	....	..	....	9.5	9.1
Other...	0.6	0 4	0 1	0 2	0.3	0.9	0.7	1.0	0.9
Total..	100 0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Thus the New York Central carried a larger proportion this year than in any previous July since 1881. The two new roads had nearly the same share this year as last, and the New York Central's gain has been at the expense of the Pennsylvania. There is little significance, however, in carrying a large or small proportion under the conditions of this year or last—that is, when there is no profit in the business. To find a normal year we have to go back as far as 1880. In 1881, 1884 and 1885 rates were demoralized; in 1882, following the worst of harvests, the shipments were small and flour formed an unusually large share of them; in 1883, the opening of the Lackawanna altered the percentages.

For the seven months ending with July, the total receipts at New York the rail and water receipts, and the date of the opening of the Erie Canal have been:

Year.	By rail	P. c. by rail.	By water.	Date canal opened.	Total.
1875.....	29,111,657	73.1	10,697.812	May 18	39,809,469
1876.....	35,264,509	68.6	16,165,868	" 4	51,430,377
1877... .	21,198.701	61.5	13,251.223	" 8	34,449,924
1878.....	45,618,128	63.4	25,675,905	Apr. 15	71,294,033
1879	59,774,214	79 1	15,761,665	May 8	75,535,879
1880.....	54.732,386	62.8	32,379,928	Apr. 20	87,112,314
1881.....	59,710.889	74.8	20,079,991	May 17	79,790 880
1882.....	36,678,025	74.2	12,768,175	Apr. 11	49.446.200
1883	44,416.482	71.4	17,826,584	May 7	62.243.066
1884.....	39,266.263	75.6	12,628.965	" 6	51,895,228
1885.....	54,223,822	82.1	11,859,556	" 11	66,083,378

The total receipts of the seven months were thus larger this year than in any other since 1881, and have been exceeded only in the four years from 1878 to 1881, inclusive, and the rail shipments were exceeded only in 1879, 1880 and 1881, and very little in 1880, notwithstanding the light July movement. This is due to the fact that the railroads now carry much more in winter than formerly. The receipts by water (all but a small amount by canal boats) were *smaller* this year than in any other since 1875, which, however, is partly due to a late opening of navigation. *Per day of open canal* the water receipts have been :

Year.	Bushels.	Year.	Bushels.
1875	142,637	1881.....	264.210
1876	181,639	1882.....	114,002
1877	155,897	1883.....	207,297
1878.....	237,740	1884.....	145,161
1879.....	187.876	1885.....	144,629
1880...	314.368		

This is to a considerable extent inaccurate as a measure of the average daily canal receipts, because it includes the receipts (chiefly flour) by vessels from other points on the Atlantic, which arrive in winter as well as summer, and amounted to 1,474,000 bushels this year. In the years for which we have the canal receipts separately, they have been, per day :

1881.	1882.	1883.	1884.	1885.
237,895	100,370	181,647	129,005	126,651

Thus the movement by canal has been nearly the same this year as last, and a fourth greater than in 1882, but 30 per cent. less than in 1883, and little more than half as great as in 1881. It is remarkable that the canal has been able to carry so large a part of the business (in June of this year 46.7 per cent., and in July 37½ per cent. of the whole), notwithstanding the low rail rates and the unusually large proportion of flour, for which it does not compete.

The percentage of the total *rail* receipts brought by each railroad in the seven months in each of the last 11 years has been :

	N. Y. Cen	Erie.	Penna	Other.	Lack.	West Shore.
1875...	42.7	37 7	18.4	1 2	....	....
1876.....	52 3	34.1	12 4	1.2	....	....
1877.....	52.2	29.5	17.5	0 8	....	...
1878.....	59.0	25.3	14 5	1.2	....	....
1879.....	51.6	28.6	18.7	1 1	...	...
1880.....	51.4	31.7	16.0	0.9	....	....
1881....	41.4	37.0	20.4	1.2	....	....
1882..	49 4	30.8	18.7	1.1	.....	..
1883.....	43.6	33.1	16.0	0.9	6 4	...
1884.....	42.9	29.2	13.1	1.0	7.1	6.7
1885.....	37.8	25.2	16.8	1.0	7.5	11.7

Thus the two new railroads brought 19.2 per cent. of the whole this year, against 13.8 last year, and 6.4 per cent. (by the one then open) in 1883. Their gain this year has come entirely from the New York Central and the Erie, the Pennsylvania having gained. But if we go back to the years before either of the new roads were opened, we find that it is the New York Central that has lost most (as was to be expected, it having most to lose), and the percentage of each of the *three old* roads of *their* total receipts has been :

	1879.	1880.	1881.	1882.	1883.	1884.	1885.
N. Y. Cen.....	52.2	51.9	41.9	50.0	47.0	50.3	47.4
Erie	28.9	32.0	37.5	31.1	35.7	34.3	31.6
Penna..... ...	18.9	16.1	20.6	18.9	17.3	15.4	21.0
	100.0	100.0	100.0	100 0	100.0	100.0	100.0

This shows exactly their relative positions with regard to each other, and that the New York Central has been the chief sufferer, while the Pennsylvania has suffered least—as might be expected, since both the new railroads bring their grain from Buffalo.

West-bound Trunk Line Shipments.

The through shipments westward from New York by the trunk lines were larger last July than in any previous July, which is robbed of the encouragement it would otherwise give by the fact that the rates were nearly one-half lower than in previous years. July, in fact, was till this year the only month in which war rates had not prevailed at some time since the establishment of the trunk line pool in 1877. It now loses that pre-eminence, and the shipments this year were increased by such traffic as a rate of 40 cents on first-class and 15 on fifth-class freight attracted from the canal and the railroads north and south which receive west-bound freight by steamers. The July shipments from New York have been for eight years, in tons:

Year.	Tons.	Year.	Tons.
1877*.....	40,677	1882....	79,464
1878	56,426	1883†.....	81,959
1879.....	52,904	1884.....	92,222
1880.....	78,193	1885	104,163
1881.....	73,114		

* Great strike, blockading the railroads. † Not including shipments by the Lackawanna, which took about one-sixth of the whole at cut rates.

Thus the shipments last July were 13 per cent. more than last year, and (allowing for the Lackawanna shipments) 9 per cent. more than in 1883, while the increase over previous years is still greater.

How much of the increase is due to the low rates may be judged by the fact that in the first half of 1882, with a similar reduction of rates, the shipments were 820,568 tons, against 536,420 in the corresponding half of 1881, when rates were nearly the same as last year, an increase of 284,148 tons, or 53 per cent.

The condition of business, doubtless, has been such this year that the rates had less effect on traffic than in 1882; but last June, the first month of the present west-bound rates, the total shipments were 101,595 tons, against 88,069 in 1884, an increase of more than one-eighth, the whole of which may reasonably be ascribed to the diversion of traffic from the canal, etc., by low rates, especially as the fifth-class increased 14,736 tons (50 per cent.), and the freight of higher classes decreased 1,210 tons. We shall therefore hardly be able to conclude from the large trunk-line shipments in July that business improved materially in that month.

For the seven months ending with July the New York shipments have been :

Month:	1880.	1881.	1882 *	1883.†	1884.	1885.
January.....	85,988	79,402	109,742	81,227	94,696	81,775
February....	90.498	81,375	120,089	78,737	96,940	84,768
March.....	98,231	106,673	167,615	102,699	108,434	107,032
April.....	84,500	99,057	161.492	86,007	108,632	104,722
May	78,350	83,970	135.030	80 284	98,352	99,154
June	72,444	85,943	126,606	80,556	88,069	101.595
July.....	78,193	73,114	79,464	81,959	92,222	104,163
Seven mos..	588.204	609.534	900,032	591,469	687,347	683,209

* Low rates of railroad war. Quite as low as the present tariff of June 1, in every month but July.
† Lackawanna shipments not included, for the seven months amounting, perhaps, to one-seventh of the whole.

We have elsewhere commented on the effect of the rates on this traffic. It appears that when rates have been maintained the shipments of these seven months have not varied greatly from year to year, being in 1881 4 per cent. more than in 1880, in 1883 (allowing for the Lackawanna) 13½ per cent. more than in 1881, and nearly the same last year, and also this year, when the reduction in rates has doubtless prevented a considerable decrease.

The shipments from the four sea-board cities, New York, Boston (and New England points), Philadelphia and Baltimore for the first *six* months of the year have been :

	New York.	Boston & N. E.	Phila.	Balt	All but N. Y.	Total.
1885.	579,046	174,017	142,444	68,988	3 3,449	982,495
1884.....	595,125	181,397	142,788	70,793	394,978	990,103
1883. .....*	594,428	203,057	129,228	81,164	413 449	1,007,877

* Adding estimated shipments by Lackawanna.

The course of shipments at other places except Philadelphia has thus been similar to the course at New York. They in the aggregate shipped 41 per cent. of the total shipments in 1883, 39.9 in 1884, and 40.1 this year. They have not gained so much as New York, however, under the tariff of June 1, because they have not the canal to take traffic from.

The statistics of these shipments form the best single key to the condition of business in the United States, when given by classes, and when there are no great changes in rates. The great reduction in rates this year robs them of much of their significance—of most of it so far as indicating the condition of business is concerned.

Chicago through rail shipments eastward in the month of July, by the complete report, including all classes of freight (and shipments from the junction points near Chicago for the last two years), have been, in tons, for the last seven years :

1879.	1880.	1881.	1882.	1883.	1884.	1885.
145 788	160,187	259,253	95,030	138,656	152,828	180,972

Thus the shipments this year were larger than in any previous year except 1881, the first full month of the railroad war, and were 18 per cent. more than last year, and 20 per cent. more than in 1883, not to speak of the gain of 90 per cent. over 1882, when the shipments were smaller than in any other month since they have been recorded.

The shipments shown here are very much greater than those given in the weekly reports, which for July footed up only 123,750 tons, nearly a third less than the complete report gives. The weekly reports include only flour, grain and provisions, but these usually make up more than four-fifths of the whole. In June also the weekly reports footed up 61,290 tons less than the complete report for the month. It is to be said that the shipments other than the three staples reported weekly are not likely to fluctuate in quantity like them. The decrease in July from previous months of this year is very large, the total shipments in successive months having been :

Jan.	Feb.	March.	April.	May.	June.	July.
322,073	259,371	366.517	344,667	300,875	237,469	180,972

The decrease from June is not half as large as last year, but larger than in any other except 1879 and 1880. July is often the month of lightest shipments, but August was last year and is likely to be this year, if rates are not very badly demoralized.

For the seven months ending with July the total Chicago shipments were, by the complete report :

Year.	Tons.	Year.	Tons.
1879.....	1,633,930	1883.....	1,398.411
1880.....	1,344,766	1884..... ...	1,764,353
1881.....	1,628,789	1885.....	2,011,944
1882.....	1,191,197		

The junction points first included in 1884 shipped about 9 per cent. of the whole, but allowing for this, the total shipments this year for the seven months were much larger than ever before. The lighter traffic in July was simply the corollary of the heavy traffic of previous months. By excessively low rates the railroads drew out seven months' business, and more, in six months, and left themselves and the

vessels with a moderate midsummer traffic. The July shipments were not light, however. If respectable rates had been obtained, they would have been very satisfactory.

The New Poor's Manual.

The eighteenth annual number of this indispensable book has been published two weeks, appearing, in fact, the day before the statement we made that it would be ready "in a few days." It is slightly smaller than last year's issue (1,044 pages of text against 1,141), and reflects in its advertising as well as in its statistics of earnings the dullness of railroad business, having 130 pages against 148 last year and 180 in 1883. The arrangement is nearly the same as for several years previous, but the tabular statement preceding the account of the railroad companies of each state has been considerably changed. Last year it gave total length of road, length in the state in question, stock and bonds and cost *per mile*, average length worked during the year, gross and net earnings per mile, and the percentage of working expenses. This year it gives, besides total miles of road, miles of track and miles of steel track, but omits the mileage within the state, which we have often found convenient. The total of stock and bonds and also of other debt and cost are given, instead of the amounts per mile, and there are columns for the number of locomotives and of cars of each class, but none for earnings.

A pretty full tabular statement would be extremely convenient and, in fact, make unnecessary most references to the separate accounts of the railroads, except where figures are wanted for more than a year—an important exception—but such a table should include all the railroad companies and not those of a single state, it being not the easiest matter in the world to decide in what state to look for a company. The Wabash, for instance, in the Manual hails from Indiana, but it begins in Ohio and Michigan and ends in Missouri and Iowa, and has (or had before it began to go to pieces) only about one-tenth of its mileage in Indiana and no general office there. There was such a general table in the last year's Manual, covering 84 pages of the introduction, but it is omitted this year, with the result that the introduction covers but 35 instead of 106 pages. The detailed account of the new railroad completed during the previous year, first included last year, is continued, and is very valuable, and an entirely new feature is a list of the stocks and bonds listed at the New York Stock Exchange during the last six years. The introduction gives the only statistics collected covering the whole railroad system of the United States, and as such is invaluable. We copied parts of it two weeks ago, and we find in it texts for discussions which we hope to present hereafter.

A work of this kind is valuable in proportion to its completeness, its convenience and its accuracy. Poor's Manual is much more complete than any other publication of the kind, though doubtless more information of certain kinds is much desired by many, as concerning the different classes of bonds, by investors and dealers in railroad securities; it is also reasonably convenient, though it would be more so if its statistics were compiled on a more uniform plan, so that one could turn at once to the particular fact wanted. As to accuracy—typographical accuracy—it is very, very much lacking, unless this issue has been much improved. The number of serious errors we have found in the tables of the several companies has been so great that we never feel safe in using the book. The "Investors' Supplement" of the *Commercial and Financial Chronicle* is very much more trustworthy, so far as it goes. Most of these errors are misprints of figures, and, of course, in a thousand pages of figures it will be impossible to keep them all out; but by far the larger part of the figures of the Manual are published year after year, and the errors ought to be eliminated from these in course of time, which has not been done. It should be thoroughly revised from beginning to end. Inaccuracy is the worst fault possible in a work of this kind, and after having been to the trouble of collecting information for long years, it is a great waste if the facts thus painfully collected are not presented, but misrepresented, by errors in computation or printing; and in this case the pity is the greater because to most of us it is the only possible source of information concerning many important facts, Mr. Poor having embalmed here the vital parts of railroad reports now mostly extinct and wholly unobtainable by the public.

The Late Robert F. Fairlie.

The sudden death of Mr. Robert Francis Fairlie, the great apostle of the narrow-gauge movement and the inventor of the engine which bears his name, is announced this week. He died at the early age of 54, having been for the past 12 years in feeble health from the effects of a bad sunstroke and fever due to exposure in Venezuela in 1873, from which he has never fully recovered.

Our older readers will well remember Mr. Fairlie's enthusiastic controversial advocacy of the narrow-gauge system which began in this journal in 1870, and was continued in frequent letters for several years. This was but a small part of the work done by him in almost every country on the globe to push his system, and in it was revealed the man. He had both the virtues and the faults of successful proselyters. Able, earnest, indefatigable, he laid hold of and boldly advanced, we do not doubt with entire good faith, every argument which would serve his turn, good, bad and indifferent, and he met with even more than the usual success of such determined enthusiasts, so far as the narrow-gauge is concerned, but not in regard to his locomotives, which he always claimed to be indispensable to the success of that gauge.

As our readers know, we have from the beginning opposed the system which he advocated. Time has already justified our position. The narrow-gauge movement is visibly dying of its own inherent weakness, which the unerring test of experience has clearly shown. Nevertheless, this should not blind us to the great good which Mr. Fairlie accomplished by the controversy which he began and carried on with such vigor and determination that he gained the ear of the world. It led railroad men to *think*, and has thus had much to do probably with the increasing power of engines and capacity of rolling stock and other minor matters which have had in recent years so great an effect on the cost of carrying traffic. In other words, Mr. Fairlie's premises that all was not as it should be were sound, although his conclusions and his remedy were unsound. It should be added also that Mr. Fairlie himself is not responsible for the follies of some of his disciples, who, as is so often the case, quite out-Heroded Herod in the extremes to which they went. Mr. Fairlie himself repeatedly declared, in the columns of this journal and elsewhere, that unless his "double bogie" engines were used on them, narrow-gauge railroads offered no advantage; notwithstanding which, there is not a locomotive which Mr. Fairlie would have owned as of his type now in use in this country, and very few which in the least approach it.

The Fairlie engine, however, is and has been since about 1868 in use on the Mexican Railway, on the long 4 per cent. (216 ft. per mile) grades, and was and is preferred by the officers of that line to the Consolidation engines, which were also tried there. It was claimed, indeed, that these latter were not given a fair chance, but at any rate they were not preferred; and the fact that American engines alone are used on the easier grades above and below this incline, both makes it doubtful whether prejudice had much to do with this decision, and illustrates the limitations of the Fairlie type, even in the hands of its friends. Its advantage for operating very heavy grades is (1) that *all* the weight of both the locomotive and fuel and water is carried on the drivers, and (2) that, in effect, two distinct engines are operated by one crew. It is not surprising, therefore, that it should be a favorite for operating such gradients in many parts of the world. It is so used on several lines in Russia, on five lines in New Zealand, and on various lines in Sweden, Australia, Cape of Good Hope, Argentine Republic, Brazil, Cuba and Saxony. A considerable number are also used on the metre-gauge government lines of India.

Mr. Farlie was the son of a civil engineer of some eminence, and at the extraordinarily early age of 22 became Locomotive Superintendent and General Manager of the works of the Londonderry & Coleraine Railway, in Ireland. He built his first engine in 1866, at the age of 35, and soon thereafter, we may fairly say, invented the narrow-gauge system to fit it. Its first practical embodiment was on the little 2 ft. gauge Festiniog Railway, where the circumstances were peculiarly favorable to give a "boom" to the theory, especially with those having little familiarity with what could be and was done in the same way with other gauges in other parts of the world.

That such a paper as *Engineering* should at this late day speak of the narrow gauge as a "great reform," as it does in its last issue, is a striking testimony to his energy and success in pushing what can only be regarded as an engineering delusion. We so far agree with *Engineering*, however, as to believe that the indirect results of his energy have been good in many ways, and perhaps worth all they have cost.

Chicago through shipments eastward for the week ending Aug. 15 last and in corresponding weeks of previous years have been, in tons:

1880.	1881.	1882.	1883.	1884.	1885.
38,646	56,291	22,921	32,432	28,912	20,710

Thus this year the shipments were less than in any other of the six, and were 28 per cent. less than last year.

For six successive weeks the total shipments and the percentage going by each railroad have been:

Tons:	July 11.	July 18.	July 25.	Aug. 1.	Aug. 8.	Aug. 15.
Flour	5,474	5,044	2,754	2,134	2,609	1,826
Grain	20,864	19,128	9,778	7,528	15,773	10,737
Provisions	7,584	8,219	8,011	7,828	7,729	8,147
Total	33,922	32,391	20,543	17,490	26,111	20,710
Per cent.:						
C. & Grand T.	10.8	11.9	14.3	15.1	12.4	10.0
Mich. Cen.	17.4	17.4	8.8	8.2	32.7	23.8
Lake Shore	20.0	14.8	14.0	11.8	9.7	7.1
Nickel Plate	7.6	9.7	7.1	10.4	8.6	13.8
Ft. Wayne	16.0	19.0	23 7	23.7	16.8	15.4
C., St. L. & P.	7.8	7.5	12.3	13.1	9.6	12 5
Balt. & Ohio	8.6	10.1	8.1	9.2	5 9	7.3
Ch. & Atlantic	11.8	9.6	11.7	8.5	4.3	10 1
Total	100.0	100.0	100,0	100.0	100.0	100.0

Thus the total shipments were 21 per cent. less last week than the year before, but larger than for two weeks previous. The flour shipments were exceptionally small, due probably to a small production at this season, and the diversion of the Minneapolis flour to Lake Superior. The provision shipments were the largest for four weeks, and larger than in April, when the total shipments were above 80,000 tons in a week. There was a large increase in the total Northwestern grain shipments last week, but it was chiefly from other places than Chicago. It was charged that rail rates were cut from St. Louis and Peoria, and by Thursday an open and general reduction to 15 cent swas made from Chicago. At this time of year shipments from the more southerly markets are likely to be larger comparatively than from Chicago, not only because the spring wheat is not yet ready for market, but also because the farmers in the country which supplies Chicago are generally very busy at this season, while further south they have got through with their pressing summer work, and have time to go to market.

July earnings are reported by 24 more railroads this week, but all of them together earned but little more than the Chicago & Northwestern alone, and, in fact, all of them were small roads. In the aggregate they earned nearly the same as last year (⅛ per cent. more, with little if any increase in mileage). Twelve of the thirteen have an increase in earnings, but the changes are mostly moderate, the great increase of 77½ per cent. by the Vicksburg, Shreveport & Pacific making its earnings only $148 per mile, and the largest of the other gains being 9½ per cent. by the Florida Railway & Navigation Co., 31½ by the New Orleans & Northeastern (making them $172 per mile), 8½ by the Richmond & Danville, 17 by the Belleville Line of the Alton & Terre Haute, 15¼ by the Ft. Scott & Wichita, 10 by the Texas & St. Louis (which yet earned but $120 per mile), and 8½ by the Western North Carolina ($142 per mile). The larger decreases were 11⅛ by the Marquette & Ontonagon, 11¾ by the Nashville, Chattanooga & St. Louis, 29½ by the Ohio Southern (bringing it down to $193 per mile), 11¾ by the St. Joseph & Western, and 10 by the Alton & Terre Haute Main Line.

The aggregate earnings of the 54 railroads that have reported for July so far were:

	1885.	1884.	Decrease.	P. c.
Earnings	$18,197,398	$18,246,833	$48,435	2.7

Thus the aggregate earnings were nearly the same this year as last, when 74 railroads reporting earned 7½ per cent. less than in 1884.

The July earnings in successive years of some of the railroads reporting this week have been:

	1881.	1882.	1883.	1884.	1885.
Ala. Gt. South	$57,382	$61,041	$72,345	$73,900	$70.092
Char., Col. & Aug.	.....	40,788	46,785	41,213	44,251
Cin., N. O. & T. P.	.....	223,168	228,158	226,702	222.920
Col. & Greenville	.....	35,012	35,023	30,880	31.682
Gulf, Col. & S. F.	.....	107,992	163,432	126,432	135.421
Nash., Ch & St. L.	166,203	186,495	195,468	187,475	165,667
St. L., A. & T. H.:					
Main Line	118,844	130,986	101,758	90,095	81,152
Belleville Line	46,549	73,641	55,560	44,596	52,288
Va. Midland	.....	122,696	146,777	131,305	130,579
Western N. C.	.....	26,184	30,553	35,719	38,833

No less than 15 of the 24 railroads reporting this week are Southern roads, and only six of these have a decrease in earnings compared with last year.

For the week ending Aug. 8 there are more signs of the movement of the new winter wheat crop by large increases in the receipts of Toledo and Detroit. At the same time there was such a decrease at Chicago, Milwaukee and Duluth that the aggregate wheat receipts of the Northwestern markets were smaller than the week before. At the chief places which receive winter wheat the receipts since June have been:

Week to—	Chicago.	Toledo.	Detroit.	St. Louis.
July 4	190,526	49,904	79 052	89,860
" 11	321,486	61,009	75,395	126,686
" 18	284.204	32 089	28 066	161,967
" 25	264,311	70,913	45,785	318,837
Aug. 1	215,508	258,556	98,919	373.900
" 8	201,631	376,588	229,261	263.626

Thus Chicago does not show an increase, not because it receives no new winter wheat, but because receipts of spring wheat fall off at this season, as is shown by a great decline at Milwaukee and Duluth, where nothing but spring wheat is received. But Toledo, in the first week of August, received 1¾ times as much as in the first four weeks reported, and Detroit received as much then as in the first four weeks, and more than Chicago received in the same week. St. Louis had a decrease last week, though it first felt the new harvest. The total receipts are very light for the season.

The proposed new standard truck, illustrated in our issue of June 26, is to have a fair test, it appears, on the Chicago, Burlington & Quincy Railroad, if nowhere else. An order has recently been issued, we learn, to each division master mechanic of the line to make requisition for "1 set of M. C. B., 1885, 40,000-lb. trucks," and to put them in service as soon as possible under an engine tank subject to severe freight service, carefully watch their running, especially in regard to repairs, and make a full report in the course of seven or eight months. Their cost is also to be kept accurately.

Unfortunately, in view of the short time remaining for the test, and the limited number to be tested, the results on any one single road will not be apt to carry great weight in respect to what is so little affected, ordinarily, by a few months' wear as a truck. It is greatly to be desired, therefore, that other roads should imitate the example of the Chicago, Burlington & Quincy, and thus obtain a larger body of independent evidence. One road at least has already done this, we understand, and probably others will do so. If any are hesitating, it is to be hoped this notice may lead them to hesitate no longer.

We also learn that the same road is endeavoring to make an arrangement with the American and Rote Brake Companies to equip a given number of freight cars with their brakes, in order to have a body of experience to present at the next Master Car-Builders' convention in respect to freight brakes. Whether the arrangement has been consummated or not we are not informed.

We are assured that a member of a firm of high standing, well known to railroad men, has perfected a process for producing the metal aluminium in large quantities and at a very low cost per pound. The process, we are told, is an entirely different one from that which has been recently attracting much attention, by which the heavy aluminium cap to the Washington monument was manufactured, at a cost far below what had been previously possible.

A claim of this kind, unsubstantiated by proof, would ordinarily be entitled to little attention, but coming from the source it does, and on a matter of so much importance, it seems worthy of notice. The patents have not yet been taken out, so that details cannot be made public.

Hardly any metallurgical advance could have a more important effect upon the arts than a reduction of the price of aluminium to something like that of copper, zinc or lead. The metal is very malleable and ductile and

in tenacity approaches iron, but it is almost the lightest of the metals, weighing only one-third as much as iron and one-fourth as much as silver. It retains a polish like silver while it is not affected like that metal by sulphur or sulphurous gases. Some very remarkable alloys with copper, iron and other metals can also be formed from it, notably one of 75 iron and 25 aluminium, which will not rust when exposed to dampness. Its cost has heretofore been about half that of silver.

THE English *Mechanical World* reprints from the *Railroad Gazette* of July 17 the account of the remarkable fast run recently made on the West Shore, which it correctly says "appears to beat any similar feat hitherto accomplished either in this country or America," and after commenting on the "strong and rapid strides" recently made in this country in permanent way and locomotive construction, adds:

As for improvements in rolling stock, although they have been very great of late years, yet we must give the palm to the Americans in this matter, the most improved forms of our saloon carriages and bogie trucks being little more than imitations and copies of what has been in use for years in America, whilst the absence of necessary conveniences and refreshment counters in most of our trains makes traveling much more tedious than there is any real occasion for. We should very much like to see the experiment tried of bringing over to this country an American train, with conductors and trainmen, and run it on one of our railways, for the benefit principally of third-class passengers, to whom Pullman cars are out of reach; at least some practical lessons might be learned from the experiment.

Without discussing the wisdom of the revolutionary proceeding which the *Mechanical World* suggests, we may at least wonder at the liberality of the concession, and, not to be outdone in this respect, admit on our part that although third-class passengers would probably find our cars an improvement in every respect, and first and second-class passengers in many respects, yet that in the matter of seats, at least, the latter classes would probably find the best coaches now running in America anything but an improvement; for the English first-class passenger seat is so far ahead of anything now in use in America, and especially the seats of the Pullman cars, that there is hardly room for comparison between them. This would be the more endurable if there were any necessity for it, but that will hardly be claimed.

From the same journal we learn that "they are said to be coupling railway cars in America by the aid of electricity," which we give as an interesting item of news which had escaped us.

Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

Chicago, Burlington & Quincy.—On the *Oberlin Branch* of the *Burlington & Missouri River* line track is laid from Republican, Neb., southwest 41 miles.

Florida Southern.—Extended southward to Lakeland, Fla., 20 miles.

Northern Pacific.—The *Cascade Division* is extended from South Prairie Junction, Wash. Ter., east to Green River, 17 miles, and from North Yakima west to Natches River, 2 miles.

Syracuse, Phœnix & Oswego.—Extended from Three Rivers Point, N. Y., southward to Syracuse, 13 miles.

Wilmington & Weldon.—On the new *Wilson Branch* track is laid from Smithfield, N. C., to the Neuse River, 2 miles.

This is a total of 95 miles on 4 roads, making 1,472 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles.		Miles.
1885	1,472	1878	1,049
1884	2,104	1877	1,013
1883	3,078	1876	1,273
1882	5,984	1875	613
1881	3,459	1874	962
1880	2,853	1873	2,025
1879	1,476	1872	3,962

This statement covers *main track only*, second or other additional tracks and sidings not being included.

NEW PUBLICATIONS.

The Practical Estimator, by J. D. Sibley and A. O. Kittredge. David Williams, New York.

This thin little volume of 100 pages, at one cent a page, is properly called practical and should be a useful one for those having to do with building, for which it is exclusively designed. To railroad men who have to do with buildings only incidentally and occasionally, but who are then responsible for their character and cost, it should prove especially useful. The first third of the volume is devoted to a (rather elementary) discussion of "how to prepare an estimate," the next third to what should be a highly useful aid for preparing building estimates, a "classified list of items entering into the construction of ordinary buildings, arranged for use as a reminder or "tickler" in "preparing estimates," each and every separate item likely to occur (and, many of them, to be forgotten) appearing to be listed. Blanks are left, however, for additions.

The same lists are separately published in the "Handy Estimate Blanks" below noticed.

The remainder of the book is devoted to a "selection of tables, rules and formulæ useful in preparing building estimates," some of which are good and not easily found elsewhere, but which as a whole appear to be a rather thin and inadequate selection. A small wages table closes the volume, which, in spite of the defects alluded to, defects more of omission than commission, we can cordially recommend to those having to do with building.

Handy Estimate Blanks.—Compiled and arranged by J. D. Sibley and A. O. Kittredge. David Williams, New York.

These blanks are printed on 26 extra large letter-sheet pages, bound in pamphlet form, and in the words of the compilers:

Have been prepared with an idea of furnishing to contractors and builders a convenient form upon which to make estimates and record the cost of the work which they execute. Two general divisions of work are recognized, namely, "Masonry" and "Carpentry." Under each of these heads sub-divisions are indicated, which include all the parts of the work required to complete any ordinary structure. In the column rulings there is a space for "Estimated Quantities," one for "Prices," and then a space for extensions, entitled "Estimated Cost." Outside of these rulings there is another set of columns, entitled "Actual Quantities," "Actual Price" and "Actual Cost."

We have rarely seen a more level-headed idea, nor one better carried out, of the kind. Some forms of the kind, but less complete, have been published abroad, but none here that we recall. All those having to do with the construction or repair of buildings should find them very useful, if only as reminders or as a means of record of past work.

TRADE CATALOGUES.

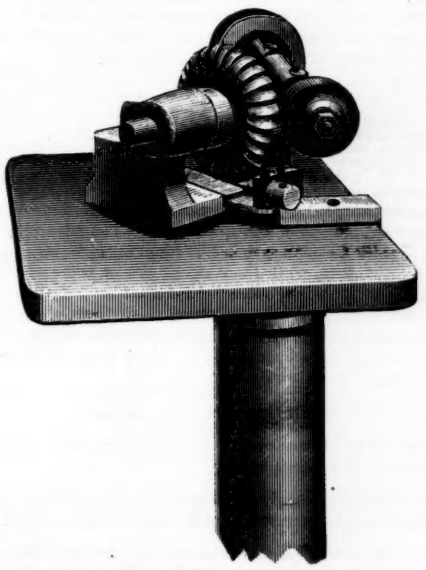
Béton Coignet and Goodridge System of Constructing and Repairing Railway and other Structures. New York Stone Contracting Co., New York.

This business-like and handsomely prepared pamphlet can hardly fail to be of interest to engineers and others having to do with railroad bridges and buildings. The merits of properly made béton coignet as a building material, under circumstances appropriate to its use, do not need explanation at this late day, and the claim made in this pamphlet, that it might be used to advantage more extensively than it is, especially for repairing purposes, seems in every way a just one. In the *Railroad Gazette* of Dec. 2, 1881, we republished a paper by Mr. O. Chanute, read before the American Society of Civil Engineers, in which the results of extensive use of it on the New York, Lake Erie & Western Railroad were given. This paper is here again republished, with notes of additional work done since, on the same line and elsewhere. The pamphlet is very fully illustrated, contains tolerably full descriptions of the process, and other information of real value to those interested in the kind of work it refers to.

Machine Tools at the London Inventions Exhibition.

Among the many striking exhibits at the Inventions Exhibition in London, there are a number of peculiar interest to American railroad men, and which it is to be regretted they should not have the opportunity to study in detail. We note a few of the more striking features of this kind.

There is at present a great tendency in England to extend the use of milling tools, which are now being used for many pieces of work hitherto wholly performed by planers or shapers. As an example of this practice, Mr. F. W. Webb is now milling his connecting and coupling-rods from end to end, the curves at the junction of the plain part and the butt being struck to the radius of the milling cutter. He states that the plain part and the radius being done at one operation, renders milling cheaper than planing and shaping, while the finish is better.



Milling Cutter Sharpening Machine.

Hydraulic tools are also coming more largely into use. Hydraulic riveters have long been considered indispensable for good work where thick plates or large rivets are used, but within the last few years shearing, punching, forging and flanging machines actuated by hydraulic power have been found to turn out an unprecedented amount of work cheaply and well.

The cover of the low-pressure cylinder (30 in. diameter) of Mr. Webb's compound locomotive is stamped out of a mild steel plate at one operation by an hydraulic forging press. Smoke-box doors are punched at one operation by a 600-ton hydraulic punching press. The saddle plates of locomotive outside fire-boxes are punched to shape before flanging, and when flanged (also by hydraulic power) the edges are so smooth and true that no dressing by hand is required. The crank-axles of the compound locomotives are also bent in four minutes out of a steel bar 8 in. diameter by an hydraulic forging press. These examples will serve to show a few of the recent applications of hydraulic power to the shaping of metal, in which it must be admitted that our American practice is as yet far behind the English.

Messrs. Greenwood & Batley, of Leeds, exhibit ten machines for milling and for making milling cutters and twist drills. Hure's cutter milling machine cuts the teeth of milling cutters from an enlarged profile in sheet iron of the form of the milling cutter to be made. It will also make taper cutters, with either helical or straight teeth, or will cut twist drills.

Saget's universal vertical cutter milling machine will make milling cutters of all forms, and will also cut wheels, twist drills, reamers, taps, etc. In this machine the "copy" or "former" has a greater travel than the table, and is therefore longer, and though its curves are similar they are not so sharp. This enables the profile to be better followed in cases where the milling tool is of peculiar form. The head carrying the cutter can be angled, enabling angular and irregular surfaces to be milled in many cases with ordinary parallel cutters.

A pentagraph cutter milling machine is also exhibited, and a machine for sharpening milling cutters when worn.

Messrs. Browett, Lindley & Co., of Manchester, however, exhibit a much simpler machine for this purpose. This machine, shown in the annexed illustration, consists of a small emery wheel mounted on a stand and driven at a high speed. The cutter to be sharpened is mounted on a spindle carried by a stand which is free to move in any direction on the bed of the machine. Immediately underneath the emery wheel is a "former" of sheet steel having the same profile as the emery wheel in plan. Similarly under the milling cutter to be ground is a "former" having the profile of the milling cutter. It is obvious that as the milling cutter is pressed against the emery wheel, the teeth will be sharpened to the exact form of the "former." A ratchet, taking into the teeth of the cutter, prevents the cutter revolving while being ground. The bearing or stand carrying the cutter is moved as required on the table by hand. The machine, while securing accurate results, is so simple that it can be worked by any one.

Messrs. Hulse & Co., of Manchester, exhibit eleven remarkably well-finished and strongly designed machine tools, each machine containing some recent improvements. A gap lathe is arranged with the screw within the bed nearer to the line of cutting resistance than when outside, as usual. The screw is driven from the loose headstock end of the lathe, and when the gap is in use the screw can be run back, leaving the gap free, though the screw is still available for feeding.

A planer taking 72 in. × 30 in. × 30 in. has two tool-boxes, self-acting in all cuts, and arranged so that the tool is lifted clear of the work at each return stroke of the table. The feed at each cut can be varied by 64ths from $\frac{1}{64}$ in. to 1 in. In a groove in the bed alongside the table is a longitudinal rack, free to slide, and having the teeth downward. These teeth gear into wheels actuating the feed. Adjustable stops on the table and sliding rack provide means for varying the feed; the greater the travel of the rack, the greater the feed. The feed is, of course, given during the return stroke of the table, and during the working stroke the rack is returned to its original position, the feed wheels being, of course, fitted with ratchet gear.

A combined milling and drilling machine has a vertical revolving cutter spindle within a square vertical sliding ram, so that the main bearings of the spindle are always close to the cutter. The square slide is small enough to be got into the interior of most work. The object of the machine is steadiness in circular cutting, so as to improve the quality and increase the quantity of the work and the durability of the cutters. The table has self-acting feed and reversing motions for the longitudinal, transverse and circular slides. A small pump is provided for forcing lubricant over the cutter.

A horizontal slot drilling machine is specially designed for cutting cotter and key-ways, etc., in locomotive rods, axles, etc. The work is supported at one end by a movable head-stock, and held in position by an eccentric vise, or it can be bolted to a removable grooved table. Two drilling head-stocks operate on the same line, but on opposite sides of the work, and are provided with variable automatic feed and self-stopping mechanism. The sliding carriage is traversed along the bed by elliptical wheel gearing, so as to give a uniform speed throughout the traverse. The length of the key way cut can be easily adjusted by means of the following device. The pin in the end of the driving pitman can be clamped as usual in any position in a T-groove on the face of the elliptical driving wheel, but to facilitate adjustment the pin is fast on a pinion which gears into a rack in the T-groove. Consequently, when the pin is turned with a screw key, it travels along the rack. The labor involved in shifting the heavy table, etc., in adjusting the stroke is thus minimized. The sliding carriage carrying the drills is actuated through the centre line of the bed, so as to avoid cross strains.

The tool-holders shown are applicable to all machine tools in which bar steel tools are used. Some important improvements are made on the ordinary form of swivel tool holder, in which the whole holder has to be slackened when the tool itself requires sharpening. The holder must consequently be readjusted to the angle at which it was working. Similarly, when altering the angle, the cutter is loosened and must be reset. In the holders exhibited the two adjustments are effected separately and independently. A cutter may be fixed, taken out and replaced in the holder without disturbing the previous angular adjustment, or the cutter may be swiveled to any angle horizontally without disturbing its position in relation to the work.

Results of Government Railroad Ownership.

[From Railroad Transportation, its History and its Laws, by Arthur T. Hadley, a volume to be published about the end of 1885 by Geo. P. Putnam's Sons.]

I.

There is no inherent reason why the rates of government railroads should be differently arranged from those of private railroads. It is not only perfectly conceivable that the two should be managed upon the same principles, but in a great many instances it actually happens. Where a "mixed system" of competing state and private lines really flourishes, this is almost always the case. The state railroads of Belgium and Germany fifteen or twenty years ago were simply ordinary roads whose revenue accrued to the state. As far as their relations to the shippers were concerned, they were run to make money; not with a view to any general considerations of public policy. This was inevitable. The taxpayers will not allow a government to lose money or make small profits on its lines when a competing private road is making larger profits. If the latter is run to make as much money as possible, the former must also necessarily follow its example, and—perhaps in a somewhat disguised form—charge what traffic will bear. This constitutes at once the advantage and the disadvantage of the mixed system. It insures that the state roads will be managed on business principles. But it does not leave the government free to manage them with a view to broader principles of public policy, right or wrong. This was probably the great reason why the governments of Belgium and Prussia found the competition of private roads intolerable. It did not interfere with their profits; it did interfere with the freedom of government action.

When the state has its hands free, it has its choice of several aims, instead of being restricted to the mere attempt to make good business profits. A government monopoly may be managed on any one of four principles: 1. As a tax. 2. For business profits. 3. To pay expenses. 4. For public service, without much regard to the question of expense.

Under the first principle, a government enterprise charges more than would be charged by private business. We have few examples of the sort in America. In Europe they are common enough, in the form of government monopolies of tobacco, salt, etc.; taken up, not on account of any business needs, but as a convenient means of taxing the people heavily.

Under the second principle, a government undertaking is managed on the same system as any private enterprise—to make all the money it can. As already indicated, this is regularly the case in those branches of industry where government comes into competition with private concerns; for instance, in the mixed system of railroads, or in the parcels post as a competitor with the express companies. If there is no such competition, but a government monopoly, this second principle cannot, in the nature of things, be applied. When a government monopoly undertakes to make all the money it can, what it gets is not business profit but a tax.

The third principle is the system of tolls, or rates based upon cost of service. On the whole, it is the general principle upon which the industrial enterprises of government are run. The aim may be to cover expenses either with or without counting interest. The interest account is not usually included in considering the cost of the post office. Here the item of interest is so small that it is possible to neglect it. In most European postal services, and especially in that of England, they aim to do something more than cover operating expenses. In the United States they regularly do somewhat less. In enterprises involving a larger capital expenditure, they aim to cover interest also. This is the case in government telegraph and railroad service, in lighthouse and hospital taxes on shipping, and in a variety of other cases.

The great mass of government activity is not industrial and does not seek to pay expenses. It is organized for public service without regard to strictly business considerations. Under this head come the administration of justice and police service, with the activity of the government in matters of education and health. They cannot pay for themselves, and have to be paid for by taxation.

It is obvious that neither the first nor the last of these principles is a fit guide for state railroad management. We cannot make them either a means of taxation or a means of gratuitous service. The former would constitute a tax on commerce as such—a thing to be avoided. The latter would constitute a tax on the community for the sake of commerce—a thing also to be avoided if possible.*

The choice then lies between the second and third of these principles. It is a question of profits *vs.* tolls. And the two different answers to this question mark two different phases of the state railroad system. The first answer—management for profit—was the earlier one. It was given, in general, whenever there was competition on tolerably equal terms between state and private roads. It prevailed in Belgium till 1870, in Prussia till 1875; in Austria it still prevails to a great extent. When roads are managed on this principle, we usually have the same system of rates which we find on private roads; a system of classification, differential rates and special contracts. In other words, there is no serious pretense of basing differences in charge upon differences in cost of service.

Under the system of tolls, on the other hand, this is made the fundamental principle. The very first schedules of rates in some countries—Belgium, for instance—were constructed with this idea in view. But these early efforts were extremely crude, and were abandoned about 1850. It was not until 1867 that there were signs of a return to this idea. In that year the railroads of the Duchy of Nassau adopted a tariff avowedly based on cost of service. Four years later the same attempt was carried out upon a much larger scale in Alsace-Lorraine, and from those provinces it spread eastward and northward, and has had a very considerable influence upon the system of charges throughout Germany.

In these provinces it was started without any fixed purpose. During the war of 1870, when Alsace and Lorraine were occupied by the German armies, the railroads of these provinces were run provisionally by German military authorities—the French officials having, of course, disappeared. Amid the variety of more pressing concerns, the Germans made no attempt to apply a complicated system of rates. They simply established one mileage unit of charge per hundred pounds: another per car-load; and a third per platform car load. It was a crude *pro rata* system, with no attempt at classification, except as, incidentally, the most valuable goods would be shipped at parcels rates, and the less valuable ones at the car-load rates.

When peace returned, the roads remained under the direct management of the Empire. What was to be the system of charges? The business of the country had grown up under French classification, and would be thrown into confusion by applying that of Germany. On the other hand, the German officials had been trained in the classification of Germany, and could not successfully apply that of France. There was a conflict between the classification suited to the business and the classification suited to the officials. They compromised by applying no classification at all—just what they had provisionally been doing in war time. What had been adopted as a makeshift now became a settled principle.

This is the so-called "natural system." It was adopted in Alsace-Lorraine in 1871; by the connecting roads, on through business to or from these provinces, in 1872; by Baden in 1873; by Hungary in 1874. The rate on any class of goods consisted of a fixed charge to cover terminal expenses, independent of distance, *plus* a rate per mile to cover movement expenses. For instance, the tariff of Southwestern Germany, reduced to American units, was approximately as follows, per *ton* of each class of goods:

	Terminal.	Mileage rates.
Express	55 cents.	9.00 cents.
Parcels	44 "	3.60 "
Box car:		
Half car-load per ton	33 "	2.70 "
Whole " " "	22 "	2.25 "
Platform car:		
Half car-load per ton	33 "	1.80 "
Whole " " "	22 "	1.35 "
Coal	33 "	0.90 "

This system in its complete form did not extend itself widely. But it had a decided influence on the rates and schedules in other parts of Germany. In 1874 Bavaria adopted a "compromise tariff." In the years 1875–76 the same change was urged in Prussia; and in the year 1877 the so-called "reform tariff" of the German Empire came into being. It differs from the natural system chiefly in the existence of a slight amount of classification, which, in practice, amounts to a good deal. The classification and mileage rates (exclusive of terminals) are as follows:

Class:	Cents.
Express	9.0
Parcels	4.5
A 1 (general rate for half car-loads)	3.0
B (general rate for whole car-loads)	2.5
A 2 (grain, lumber, coal, etc., half car-loads)	2.0
Special I. (grain, etc., car-loads)	1.8
Special II (Lumber, etc., car-loads)	1.4
Special III. (Coal, etc., car-loads)	1.04-0.88

Austria adopted a similar system, but did not go quite so far toward the cost-of-service principle. The chief difference was that the German system had equal mileage rates (except for the terminal), while the Austrian system was constructed on a sliding scale, the mileage rates for long distances being less than for short ones. It should be understood that both in Germany and Austria there are special rates which deviate from the general schedule. In Germany they are rather infrequent, in Austria quite common.

* The latter alternative is not always avoided. A subsidy in almost any possible form is a tax on the general community for the sake of commerce, which could otherwise not exist. If repaid at all, it is repaid indirectly. Another instance of the same kind occurs frequently in the United States postal service. There are a great many mail routes which are necessarily unprofitable. To maintain them involves a tax on somebody—either on the letter-writers on more frequented routes or on the general funds of the community. The latter alternative is the one usually chosen.

Foreign Technical Notes.

Locomotive boiler pressure tends upward in Europe; 180 lbs. is no longer uncommon.

Of 12 different speed recorders tried on German roads, none is reported to be both reliable and easy to keep in repair.

Crucible steel has been found safer for tires than Bessemer and Martin by the Germans, and its life is greater. Between the two latter they have not much choice.

It is admitted by the German Railroad Union that passenger cars with end entrances and longitudinal passages are most profitable for traffic requiring economy in train hands and lightest weight, with solid construction.

The question arises: What traffic does not call for these?

Attempts have been made with considerable success on German roads to diminish the swaying of engines, and with it the wear of the rear driver flanges, by making the tender coupling more or less rigid laterally; and, indeed, four-wheeled locomotives have been used on some roads for line engines by having heavy shoot bolts on each side entering sockets on the tender, and thereby preventing either vertical or horizontal swaying.

Out of 36 German railroads replying to an inquiry, 19 already oil their stock exclusively at regular periods; six are trying the plan; eight have introduced it partially, and only three practice the old method of oiling as needed. Most roads use axle boxes requiring a wrench for opening, and almost all use a broad spring under the journal covered with felt, which draws up the oil from the reservoir below, and, being in constant contact with the journal, keeps the latter neatly and constantly oiled.

Some roads use also an extra reservoir on the upper half of the box which drops oil by a wick through a hole in the brass.

Where the two are used in connection with the periodic oiling, tight journal boxes and large bearing surfaces, hot boxes are almost unknown.

In contrast with the advanced character of its oiling apparatus, European freight braking is somewhat barbarous. Many cars have no brakes, and in such cases the approved method for switching work is scotching with a stick of wood under the wheel, or putting the stick through the pedestal frame in such a way that by sitting on it, it is made to act as a brake on the wheel. A large class of cars have the brakes operated by a long lever on the side of the car body, difficult to manage except on the ground alongside, which is the usual base of operations. The most favored material for brake-blocks is cast-iron with 20 to 25 per cent. of steel or wrought-iron turnings melted with it. Mineral oil is highly favored for car journals. It is specified to be free from all foreign substances and from acids, alkalies, salts, tar and water; to have no drying qualities; and not to alter by keeping. The specific gravity at 59° Fahrenheit to be between 0.88 and 0.92. The consistency must vary little at the ordinary temperatures; and it must not stiffen at a higher temperature than 14° F. It must not give off inflammable vapors at a lower temperature than 320° F., and no permanently inflammable ones at less than 356° F., and must not foam even when highly heated.

Progress in the Substitution of Steel for Iron.

Mr. E. B. Dorsey publishes in the Transactions of the American Society of Civil Engineers for May, 1885, a paper in continuation of one published in February, 1884, upon the same subject ("Structural Steel"), giving the following concise and interesting summary of progress in the use of steel for ship and bridge building, locomotive boilers and steel castings:

The last few years have shown a rapid increase in the use of mild steel for structural purposes, especially in ship and bridge building. In shipbuilding it has passed entirely through the experimental stage. The following table of iron and steel vessels built, classed by Lloyds' Registry of British and Foreign Shipping, shows its progress within the last six years:

Years.	* Tonnage.		Per Cent.	
	Steel.	Iron.	Steel.	Iron.
1878	4,470	517,692	.0085	.9915
1879	16,000	470,969	.0328	.3672
1880	35,373	459,994	.0714	.9286
1881	42,407	696,724	.0574	.9426
1882	125,841	851,075	.1290	.8710
1883	166,428	933,774	.1512	.8488

* Note.—All the tons named in this paper are the long tons of 2,240 pounds.

The steel tonnage shows a continued increase each year, also the percentage, except in the year 1881, when the difference in price became too great to use steel profitably over iron.

The above table is taken from a recent paper read before the Iron and Steel Institute of Great Britain, by Mr. William John, of Barrow-in-Furness. He also says, in the same paper:

"Out of the whole material so employed (in five years, 19,157 tons of steel in a total of about 100,000), we have not had the slightest bother with either plates or angles or beams; but it is far different with iron.

"Messrs. Denny Brothers, who were the first among shipbuilders to take up the question of steel vigorously, and who have kept the lead in it, have built during the same period nearly 68,000 tons of steel shipping out of a total of 96,000 tons, amounting to over 70 per cent. of their total.

"Mr. William Denny, as you will remember, gave his views very fully before this Institution, in a valuable paper read here in 1881, and further experience has confirmed him in those views, as I know from a communication received from him a few days ago, in which he says steel has become so uniform as to have lost interest, while iron absorbs attention from its deterioration and want of uniformity, and the men complain if they are put to work iron, on account of the amount of spoiled work involved.

"I believe, from what I can learn, that this experience of Messrs. Denny and ourselves in the working of steel in the shipyard, is borne out in other yards about the country."

The preceding statement by Messrs. Denny Brothers and Mr. William John are very strong indorsements of mild steel over iron, especially so as neither of them are manufacturers of iron or steel; their evidence is entirely impartial, and this after five years' very extensive working in steel in shipbuilding; in no kind of structural work is the material so tortured as in shipbuilding; if it stands this test, it should stand all others.

In England it is estimated that, after allowing for additional carrying capacity, owing to the greater strength of steel, and consequently comparative lightness of steel vessels over those built of iron, iron and steel vessels will stand on commercial equality when the cost of steel is 2 cents, and iron 1¼ cents per pound.

In bridge building steel has also passed through the experimental stage; in proof of this can be cited the success of the St. Louis bridge—the pioneer of large steel bridges—the Brooklyn Suspension, the Niagara Cantilever, the Plattsmouth, the Bismarck and the Blair Crossing bridges, the bridge on the Northern Pacific at the second crossing of Clarke's Fork, and the number of smaller ones that have been built in Europe and India. All have given such great satisfaction that Messrs. Barlow and Baker, the distinguished engineers, have been encouraged to build entirely of steel the New Forth bridge, with its two unprecedented spans of 1,700 ft. each.

Mr. Benjamin Baker, of Messrs. Fowler & Baker, the engineers of the Forth Bridge, writes me under recent date:

"We have not yet found it necessary to reject a single plate or angle bar delivered at our works by either the Steel Co. of Scotland or the Landore Siemens Steel Co., and have had no failure or trouble of any kind.

* * * * * * * *

"We have about 6,000 tons of steel delivered at present. When once you have got accustomed to steel, and the facility

of working and welding it, you look upon iron as a poor sort of metal."

The London & Northwestern Railway of England commenced using steel boilers in their engines in 1863; in 1883, they had in use 1,679 engines with steel boilers, giving entire satisfaction.

In the last 20 years (from 1863 to 1883 inclusive) there were made in all the world 35,805,388 tons of Bessemer steel; nearly all this was made into rails.

This, in itself, ought to be convincing proof of the superiority of steel over iron; the practical working of this immense tonnage that has given entire satisfaction. After this experience, where is the engineer that says he prefers iron to steel rails?

If steel will answer better than iron for rails, where it is exposed to frequent shocks and blows from the modern heavy engine, often at high speed over an inelastic roadbed, why will it not answer better also for structural work where the shock will not generally be as great?

Within the last few years the manufacture of steel castings from mild steel has made great progress, both in improved quality and reduction of cost. These castings are not quite as strong as the same composition would give in wrought steel, provided it is in such shape or size that it can be well worked.

We know, however, the great difficulty of forging properly large or intricate pieces. For this reason such difficult pieces are probably stronger cast than forged.

In making steel castings, the principal difficulties are:

1. The intense heat required to keep the steel fluid makes it difficult to find a material for the molds that will not be affected by this intense heat, or will not injure the steel.

2. Great care is required to make the molds so as to allow for the great contraction in cooling (which is double that of cast iron) and yet strong enough to resist the pressure of the fluid metal.

3. The necessity of preventing unequal cooling, which is liable to cause cracks or fracture.

Many large steel castings have been made in England and France which, from their size and shape, could not have been well forged. These castings have given entire satisfaction. Among them may be named rollers over 8 ft. long and 3 ft. in diameter; crank shafts and shafts over 16 in. in diameter; rams for torpedo boats, 28 ft. from end to end, weighing 6 tons; stern and rudder frames for ships, 27 feet by 14 ft., weight 6 tons.

The Steel Company of Scotland cast of soft steel a gun carriage that weighed in the rough 28 tons, and after being finished 17 tons, which gave entire satisfaction.

After annealing, castings from mild steel have about the same ductility and about one-half more tensile strength than good wrought-iron. All castings from mild steel require to be thoroughly annealed.

Lloyds' Registry of England, which gives the rating to shipping, made a thorough investigation of the advisability of permitting in the construction of vessels the use of steel castings for stems, stern frames, rudders, tiller quadrants, crank shafts, levers, link blocks, and other parts of vessels and engines, that have been made of wrought iron. After careful tests and experiments on a large scale, both in England and France, Chief Engineer Parker reported as follows:

"Tests were also made, not only upon samples of the material cut out of castings, but also upon castings themselves. And similar tests were conducted upon samples of forged iron and forged steel. The result is that we are now convinced that structures can be made of cast-steel quite as fit for the purpose intended as those usually constructed of wrought-iron, and that they can at the same time be made in such a manner as to avoid the uncertainty inevitably associated with large iron forgings, owing to the large number of weldings necessitated in them."

I can see no reason why large cannon cannot be cast in steel, as described in a paper read before this Society by Capt. O. E. Michaelis. Of course, one must expect to encounter difficulties and mishaps at the beginning in any important departure from the usual routine, but I am satisfied they would be soon overcome. At any rate, it is worthy of most earnest effort on the part of our government. In the United States there have been made good steel castings, such as rollers over 3 ft. in diameter and 8 ft. long, and cylinders 6 ft. long and 3 ft. diameter, with 10 in. core. Making the steel gun is only multiplying the cylinder 4 to 8 times.

Engineers should not expect too much from wrought-steel or steel castings. As steel can be had with tensile strength of 150,000 lbs. per square inch, there is great temptation to make use of high tensile strength in order to save weight. But this saving is at the expense of reliability. I would not advise its use in any case, whether in compression or tension, with a greater tensile strength per square inch than 70,000 lbs. This will give a very reliable and uniform material, with elastic limit of about 40,000 lbs., which can be worked up to very closely, owing to the great uniformity in steel. In my opinion, this will make a stronger and safer structure than if made of stronger steel.

When this limit is much exceeded, both steel castings and wrought-steel become unreliable, cracking and breaking without apparent cause. This uncertain action or quality of steel, when of greater tensile strength than 80,000 lbs. per square inch, must be governed by some law; but as yet this law has not been discovered. This action is so uncertain that I know no word that expresses it so well as "caprice." This is not very scientific, but it expresses this peculiar uncertain action very correctly. This caprice increases with the tensile strength, commencing, say, at about 80,000 lbs. per square inch tensile strength, the percentage of its increase being much greater than that of the tensile strength. Until the laws governing this capricious quality are known, and the remedy found and applied, engineers would do well to confine their work to the preceding limit, leaving the range between 70,000 and 80,000 lbs. as an extra factor of safety.

Very great advance has been made in the manufacture of soft or mild steel within the last few years, by which the quality has not only been improved, but the price reduced; for the best steel suitable for boiler purposes to about that of good wrought-iron. This gives the engineer at about the same price per pound a much more reliable and stronger material, which, consequently, allows him to reduce the weight and cost.

In a few years an order for wrought-iron for structural purposes will be as much of a curiosity as an order for iron rails would now be from a rich road with heavy traffic.

At a later date steel castings will largely take the place of difficult or heavy workings that are now made in wrought-iron, or wrought-steel, or cast-iron. Cast-iron will be confined to cheap works, where strength is not required.

Engineers, especially those engaged in structural branches of the profession, should act upon the conclusion that, in engineering, the iron age is rapidly passing away, as the stone age has done, and will soon be replaced by the steel age.

THE SCRAP HEAP.

In the Depot.

There was a large crowd of excursionists in the depot at Savannah. There was a pale-faced, slim-waisted young man, weighing about 105 pounds, who paid a colored man a quarter to get some baggage checked. The man didn't appreciate the situation and took his time for it. Indeed, the young man hunted him up to discover that he was gossiping with some of his color, and that the baggage was still uncared for. He spoke his mind pretty freely, and was promptly "sassed" in return. All of a sudden the burly colored man drew a razor from his pocket, and started for the light-weight with the remark that he'd make bloody carpet rags of him.

It would have been a good time for the young man to pull a revolver, but he made no motion. In such a crowd no one knew exactly what was happening, and so the rush of the negro was not stayed. He took two skips and a jump, the razor in his right hand, and, as he landed in front of the young man, the keen-edged weapon made a sweep for the white throat. Next instant it was flying among the rafters of the building, and the would-be murderer was caressing his elbow and howling with pain. As he whirled around he got a couple of "lifters" which shot him out of the circle, and the young man went to see about his baggage.

"What did you do?" I asked him after we were off.

"Kicked the elbow of his razor arm," he answered.

"Is it a trick?"

"Well, it took me a year to learn it."

"Where?"

"In Jamaica. It will be six months before he can raise that hand to his collar button. You ought to learn it. It saves carrying a revolver, is handier than a knife and you don't bang your knuckles up knocking folks down."—*Detroit Free Press.*

An Item in Prospect.

"You may look out," said a locomotive driver to a reporter yesterday, "to get another local something like the one you had a few days ago about the boy being killed." On being asked to explain, the engineer stated that yesterday he was startled to see a colored boy run to the track in front of the approaching train. On getting between the rails the boy seemed to melt down into the ground and the engineer knew that the little imp had jumped down into a cattle guard to let the train thunder over him. A curve was just beyond the cattle guard, and as the train rounded this the engineer looked back from his cab window and saw the boy crawling out of the whole unharmed, but doubtless thoroughly charmed by his experience. Instances of this kind used to be frequent about Charlotte, but the engineer states that this is the first he had known since 1870. His fire-box was dropping coals and a little darky had just sunk into a cattle guard ahead of him. Before he could stop the coals from falling he reached the cattle guard, and the little negro was almost roasted alive under the shower of coals that dropped on him. "I'll tell you," repeated the engineer, "you may look out for another big local, for it's coming."—*Charlotte (N. C.) Observer.*

A Singular Accident.

The Hagerstown (Md.) *Mail* relates that as a fast train stopped at Point of Rocks the engineer was found stunned and almost lifeless, suffering apparently from a blow in the head. A dead chicken was found lying in the cab. The only explanation that could be given was that the chicken attempted to fly across the track while the train was running at a high speed and came in collision with the driver's head. The latest news was that the unfortunate man had recovered consciousness, but that his recovery was by no means assured.

The *Mail* does not explain where the fireman was, nor how it happened that he saw nothing of the affair.

The Oldest Locomotive Engineer.

One of the oldest locomotive engineers in this country—probably the oldest now in active service—is Mr. Benjamin Hafner, who is now running an express train on the Eastern Division of the New York, Lake Erie & Western road, between Jersey City and Port Jervis. Mr. Hafner began his railroad career as a fireman on the Baltimore & Ohio in 1840 and was given an engine in 1843, running first on express trains between Baltimore and Washington and afterward on the mail train between Baltimore and Cumberland. In 1848 he left that road, and went to the Erie, running a passenger train there until 1854, when he went west, and was for a time on the Illinois Central. Returning eastward he ran on the Erie again for a short time, and on the Baltimore & Ohio, and finally in 1858 settled down on the Erie, and has been on that road ever since, having run on the line altogether 31 years. He has thus had a railroad experience of 45 years, 3 as fireman and 42 as engineer, and is still, we trust, good for many years more.

Mr. Hafner has had a varied experience with different styles of locomotives, and has doubtless many reminiscences which would be interesting. In one respect he has been singularly fortunate—he has never had a bad accident, and, although he has always run on passenger trains, the only passenger ever killed on one of his trains was by an accident which was certainly not his fault, the death in question being caused by what was called a "snake-head" on the old-fashioned strap rail, that is, by the end of the rail working loose and catching on a car wheel, and thus being driven up through the floor of the car.

Railroad Men's Christian Association.

The seventh annual day of prayer for the railroad men of the Lehigh Valley was observed on Sunday, Aug. 16. The committee of the Railroad Men's Christian Association issued a circular to the Christian workers of the Lehigh Valley urging all to make this seventh annual day memorable and requested pastors of churches to preach on the subject or to make special prayer for it at the hour of the morning worship. This request was very generally complied with, as in previous years.

A branch of the Association has lately been established at Port Jervis, N. Y., which is largely a railroad town. A considerable membership is promised. The New York, Lake Erie & Western Co. will give the use of the rooms and will also assist in furnishing them.

Sun Struck on His Engine.

Train No. 24 on the Boston & Albany Railroad left Worcester yesterday morning at 9:30 o'clock, on time. It was an express train and due in Boston at 11 o'clock. Conductor R. B. Gardner was in charge, and Edward King managed the engine. When South Framingham was reached all was well, and after taking on more water the train sped on its way toward Boston. Shortly after passing Cottage Farm station Engineer King felt that he was becoming sick, and as the rapidly flying train sped down the track he fully realized that if something was not done at once he would lose all control of the engine and cars which followed him, and that a terrible disaster would ensue. He felt that the intense heat was more than he could stand up under; he felt his physical powers dropping away inch by inch, and, as a final effort, just before the engine and train arrived at the crossing of the Providence road he gave all his effort to shut off the steam and dropped insensible on the floor of the cab. If the engine had been allowed to go by an awful disaster might have resulted. There was a train on the Providence railroad track all ready to cross. Engineer King dropped apparently dead with his hand on the throttle. Conductor Gardner at once took charge. The latter very soon procured the services of an engineer on a switching engine, and the train was brought to Boston with very little loss of time. Engineer King, although very ill, was conveyed to his home on the 3:30 p. m. train.—*Boston Advertiser, Aug.* 15.

Tea Time.

There has been considerable competition of late between the Northern Pacific road and the Union Pacific road on tea traffic, each road endeavoring to make the quickest time on record between the Pacific coast and Chicago. Some time ago the Northern Pacific made some very quick time with trains loaded with tea, which caused the Central Pacific and Union Pacific roads to exert themselves to excel it. The latter lines have just sent three tea trains to this city, all of which made time excelling that made by passenger trains. The first train left San Francisco at 3:20 o'clock p. m., Aug. 2, and arrived here Aug. 7 at 2 o'clock, the time being 4 days 22 hours and 40 minutes. The second train left San Francisco at 1:55 o'clock p. m., Aug. 4, and arrived in Chicago Aug. 9 at 2:55 a. m., the time being 4 days and 13 hours. The third train left San Francisco at 6:50 p. m., Aug. 5, and arrived here Aug. 10 at 8 a. m., the time being 4 days 13 hours and 10 minutes. This is the fastest time on record, but another tea train is now on the way, and the intention is to have its time exceed all previous efforts. The regular time for passenger trains is 4 days and 16 hours.—*Chicago Inter-Ocean, Aug.* 15.

The Northern Pacific put its first tea train through from Tacoma to New York in quick time; it reached New York Aug. 17, having made the run of 3,378 miles in 8 days 4 hours, an average of 17¾ miles an hour, without allowance for stops.

A Narrow Escape.

The recent discharge of Homer Bartlett, the engineer of the Boston & Albany's "Modoc" train, which leaves Boston daily at 7 p. m., an old and very faithful employé, has brought to light the particulars of an occurrence at the Union station in Worcester last week, which narrowly escaped resulting in a terrible calamity. The affair has been kept quiet up to the present time. It seems that a heavily-loaded excursion train from Providence to Nashua was about to cross the main tracks of the Boston & Albany Railroad east of the Worcester station, when the "Modoc," bound west, with nine cars full of passengers, came thundering down the grade in reckless disregard of the signals set against it. Fortunately the excursion train was momentarily delayed on the south main track by the failure of the air brakes to let go promptly, and this slight delay doubtless saved the lives of hundreds of people, for in a minute more the excursion train would have been diagonally across the north track in front of the fast train. Engineer Bartlett's defense was that the glare of numerous locomotive headlights in front of him confused the signals so that he mistook them. The officers of the road were loath to discharge him, but discipline required it.—*Boston Traveller, Aug.* 18.

What is It?

The following curious circular has been sent to a number of railroad officers and others:

"*A system of carrying mail and express to compete with the present locomotive.*

"David Allan, formerly of Greenock, Scotland, residing at present at Joliet, Ill., to all railroad stockholders and the public in general: I will guarantee to run the cheapest train per mile and give the most accommodation for the least amount of money of any railroad system that is existing at the present day, and challenge any locomotive builder or railroad master mechanic to meet me publicly and discuss the statements I am able to produce. I will state that the average passenger train is not worth the trucks it runs upon, and is not adapted to the wants of the public. I will take the passenger traffic at present in America, 24,500,000 passenger-miles in the day, 750,000 train-miles per day, locomotives' expenses per mile 22 cents, number of locomotives to run 10,714, the cost $85,000,000. I will run for 1 cent per train per mile, or 16,000,000 of miles for the same if required. The total capital on my system $7,000,000 to do the amount of actual work. I can cover the whole road in 10 minutes with passengers, mail and express, and any part of the road can be a station with me. Cost per hour to run it from 20 horse down to the lowest power, 40 cents to 6 cents per hour per horse-power. It is not what the locomotive could earn or draw, it is what it earns and draws. I can run 300 to 700 passenger-miles in a day, rolling stock $100. I am open to any arrangements upon the earning of or manufacturing of it in the meantime. According to the laws of any nation, agreement may be its gross earnings. I will run in opposition to any system at present between the Atlantic and Pacific. I am at present a very common section hand.

"Joliet, Ill., U. S. A. "DAVID ALLAN."

TECHNICAL.

Locomotive Building.

The Manchester Locomotive Works in Manchester, N. H., has recently delivered several new locomotives to the Chicago, Burlington & Quincy road.

The Pennsylvania Railroad shops at Altoona are building a consolidation freight engine of a new class, with a larger boiler than those now in use.

The Illinois Central Shops in Chicago are building four new locomotives for the road. They are passenger engines with 17 by 24 in. cylinders.

The Car Shops.

The Pittsburgh, Fort Wayne & Chicago shops in Allegheny, Pa., have just completed 160 new gondola cars, to carry 20 tons each.

The Pullman car shops in Pullman, Ill., are completing an order for 50 street cars for the Broadway Railroad in New York.

Bridge Notes.

Information has been received that the commission of engineers to examine the plans submitted for the great Hawksbury River bridge in New South Wales has selected two of the 16 plans and bids submitted, and has forwarded these two to the New South Wales government for final award. One of the plans selected was put in by an English firm, the other by the Union Bridge Co., of New York and Buffalo. The final award cannot be received in less than six months.

The contract for the bridges on the new Indianapolis, Eel River & Southwestern road has been let to Brown & Cochran, of Indianapolis.

Iron and Steel.

D. W. C. Carroll & Co., of the Fort Pitt Iron Works in Pittsburgh, have contracted to furnish a Bessemer steel plant to Shoenberger & Co., of that city, and are also doing some work for a steel plant for Jones & Laughlins.

The lessees of the Vulcan Iron & Steel Works in St. Louis are putting the works in order and expect to start them up early in September.

The Chickies Iron Co. will shortly blow out its furnance at Chickies, Pa., and tear it down. A new furnace of much larger capacity will then be built in its place.

The Pittsburgh Forge & Iron Works have resumed work, after a long stoppage, in nearly all departments.

Katahdin Furnace in Maine is to be rebuilt by the Katahdin Charcoal Iron Co., recently organized at Bangor, Me., with $600,000 capital stock. The directors are Charles V. Lord, F. H. Wilson, Chas. A. Gibson, E. M. Hersey, of Bangor, and A. P. Gould, of Thomaston; Treasurer and Secretary, Henry McLaughlin. O. W. Davis, Jr., is the General Manager, with office in Bangor, and Ernst Sjöstedt, recently from the Cherokee Iron Works, of Georgia, is the Superintendent, with office at the furnace. The work of rebuilding is now being actively prosecuted, and the company expects to be in blast about Oct. 15. The capacity of the plant will be enlarged to 600 tons per month of car-wheel charcoal pig iron. A large proportion of the product is already engaged.

Chattanooga Furnace in Chattanooga, Tenn., has gone out of blast for repairs, but will start up again as soon as the necessary work is completed.

Manufacturing and Business.

The Curtis Regulator Co., of Boston, has just finished a large pressure regulator for the water-works of the city of Moscow, Russia.

The National Railway & Street Rolling Stock Co., of Concord, N. H., owning the Stimson patent for improved car-axle boxes, has its journal boxes now on trial on the Maine Central, the Portland & Ogdensburg and other roads. The trials will necessarily last some time, as it is the company's purpose to give them a thorough test. The officers of the company are: E. S. Nutter, President: N. E. Martin, Clerk and Treasurer; M. V. B. Stimson, Age

The Rail Market.

Steel Rails.—The *Iron Age* says: "Eastern mills have booked during the week about 25,000 to 28,000 tons of orders, chiefly for the South, though the Northwest and the East have taken round lots. Since in almost every case the price is for delivery at distant points, it is possible, in the absence of accurate data on the freight rates, to estimate only approximately the net figure at mill. It is certain, however, that in many instances $27 at mill has been considerably shaded. Small lots have fetched $28 at tidewater."

A meeting of the associated Bessemer steel rail manufacturers was held in Long Branch, Aug. 14. The following companies were represented: Bethlehem Iron Co.; Pennsylvania Steel Co.; Carnegie Bros. (limited); the North Chicago Rolling Mill Co.; Joliet Iron & Steel Co.; Union Steel Co.; Cleveland Rolling Mill Co.; Cambria Iron Co.; Lackawanna Coal & Iron Co.; Albany & Rensselaer Iron Co.; Scranton Steel Co., and Worcester Steel Co. After a long discussion it was unanimously agreed to reduce the production of steel rails so as not to exceed the demand, and to enable manufacturers to make rails at remunerative prices next year. The reduction will be based upon the capacity of each mill, and will take effect Jan. 1, 1886.

The Bessemer Steel Co. (limited), of Pennsylvania, representing 11 of the largest steel manufacturing concerns of the United States, held its semi-annual meeting, and discussed the depression in the trade, for which various remedies were suggested. The meeting adjourned to meet again in Philadelphia.

Rail Fastenings.—The market is dull, with prices nominally unchanged at 1.90 cents for spikes in Pittsburgh, 2.40 @2.80 for track-bolts, and 1.60@1.70 for splice-bars. Some sales are reported on private terms.

Old Rails.—The mraket for old iron rails is unsettled and quotations are difficult to make, from $16.50@$18 per ton at tide-water being reported, according to quality. Old steel rails are quoted at $16.50@$17.50 per ton in Pittsburgh, according to length.

Car Couplers.

The Lehigh Valley has tried the McKeen safety coupler in three forms: 1. The improvement added to the ordinary wrought-iron draw-bar, the only change required in the original forging being the drilling of two ⅝-in. holes. 2. An annealed cast-steel draw-bar (weight, 83 lbs.). This is the form which was exhibited at the Master Car-Builders' Convention. 3. A cast-iron draw-bar (weight, 114 lbs.). This form has recently been tested and will be put on a number of cars.

In the last tests of the coupler at Packerton the cast-iron draw-bar was used and put to severe tests, on very crooked track, using links from 9¼ to 12 in. long.

Brake Tests.

The trial train of the American Brake Co., of St. Louis, recently gave several tests of its performance on the West Shore road near Little Ferry, N. J., in the presence of officers of the West Shore and the Long Island roads.

The Rote Automatic Brake Co., of Mansfield, O., offers to furnish any railroad with brakes for a trial train. The company also gives notice that it wishes to have tests of its brake made in competition with any other.

On Monday, Aug. 16, this train gave a series of tests on the Lehigh Valley road. As has generally been the case, these tests were very successful, and the action of the brake was approved by a number of railroad officers who were present.

Surveys Which Do Not Agree.

The Central Pacific land office, according to a San Francisco dispatch, has discovered, in making up its maps from the government surveys filed at Salt Lake and Boise City, that the surveys of Utah and Idaho do not match exactly, and that there is consequently a strip of land 2½ miles wide between the two territories which does not belong to either, at least according to the maps.

A New Style of Street Rail.

The new street rail patened by President C. A. Richards of the Metropolitan Railroad and Mr. Elizur Barnes, his Roadmaster, is attracting much attention from street railway men all over the country, on account of its many advantages over the rail now in use. The common rail is thin, and is fastened to longitudinal timbers, which are nearly even with the pavements of the street. There is on the inner side of the rail a broad flange, in which the wheels of heavy wagons as well as light carriages easily run, but which frequently works mischief to the latter when attempts are made to turn out for an advancing car. The new rail resembles the ordinary T rail used on steam railroads, but differs from it especially in the formation of the upper part, which is adapted for street railroads. The flange of the rail is just wide enough to allow the flange of the car wheel to run it easily, but is too narrow to admit any carriage wheel. The longitudinal timbers upon which the rails are placed are set 3 in. beneath the ground, the lower part of the rail being fastened to them by spikes driven on the outside of the rail, as are the rails of a steam railroad fastened to the ties. The rails are fastened together by fish-plates, thus forming a continuous rail and doing away with the familiar "thump-thump-thump" heard as the car passes from one rail to another. The new rail is claimed to be more economical than the old; it will last longer, and the timbers under it will cost less, and will not have to be replaced so often. In fact it is thought that where a common street car track lasts three years now, the new style will last 10. President Richards is having 200 tons of the new rails rolled at Worcester, and proposes to lay them on the new locations recently granted by the aldermen. —*Boston Traveller.*

A Ship Railroad in Nova Scotia.

A Bangor dispatch says that prominent railroad and shipping men in New Brunswick and Nova Scotia are just now interested in a project which is intended to revolutionize the coasting traffic and to develop the resources of the north shore of New Brunswick and Prince Edward Island. It is the construction of a ship railroad across the isthmus between Northumberland Straits and Chignecto Bay, the northern arm of the Bay of Fundy, by which a saving of over 300 miles can be made in a voyage from the north shore of Prince Edward Island to Boston or other ports in the United States. By the natural route vessels from the Gulf of St. Lawrence are obliged to make a circuit of Nova Scotia, which is a great obstacle, not only by reason of the distance, but also on account of the dangers of navigation along its rocky coast. Work has already been commenced on the road, and good progress is being made, the Chief Engineer being John Fowler, who constructed the underground railroad in London and who is now engaged on the bridge over the Firth of Forth. A London syndicate has signed a contract to furnish the money required for carrying out the project.

Adverse Critcisms on Compound Locomotives.

A correspondent of the *English Mechanic*, for whose competency and good faith we cannot vouch, but have no reason to question, seems to have an unfavorable opinion of the compound locomotives on the London & Northwestern Railway, which he expresses as follows:

"These, as you are well aware, were designed chiefly with the view of reducing fuel consumption. There are two classes of compounds, the small or 'experiment' class, working with 150 lbs pressure, and the big or 'Dreadnaught' class, working with 175 lbs., and weighing over 40 tons. Both classes, however, really work at pressures considerably higher than the nominal figures, which is to be borne in mind in considering the results yielded.

"One fact in reference to the compounds admits of no contradiction—they are unable to attain the highest speeds. Up to about 50 miles an hour they are well enough, but back pressure in the big cylinder, stiffness of working, or some other cause prevents the proper running of the engine when this rate is exceeded. However great the emergency, a compound cannot exceed its normal pace down-hill, and thus it happens that if by any mischance time is lost up-hill, the train has to come in late, for time cannot be made up down-hill. With some of the fastest trains it is all but impossible for the compounds—small ones, at any rate—to keep time. These facts are more than even sophistry can distort; and while, therefore, the number which have been built is cause of astonishment, it is merely another instance of the pertinacity of engineers.

"Next to time lost in running, comes time wasted in starting. Sometimes compounds have not merely delayed, but have absolutely refused to start at all until assisted by another engine. With heavy trains half a minute to a minute is often lost on starts, especially if the gradient is unfavorable. Of course, other engines do so, too, sometimes, but not to the extent the compounds do.

"It is not easy to get at the coal consumption, but inquiries tend to show that drivers receive no more coal premiums than formerly, if as much. I am induced to believe that no coal really is saved, a view which is supported by the trial on the Southwestern. If report is correct, the number of failures with compounds is abnormally high and general repairs expensive. The oil required for lubricating purposes is also very considerable.

"There may be among your numerous readers some one who will do battle for the compounds, and give us the other side of the case. On the Northwestern I have searched in vain for an official or servant who will say a good word for the new engines. Many a time have I been met with the reply, 'We must not say anything about them.' Every one dislikes the compounds, though it would not do to express it. Hence the reticence of the drivers. But when a driver has a good engine, did any one ever find him unwilling to expatiate on its merits?"

The evidence presented in another column that compounding is advantageous, comes from so many different sources that something more definite than this is required to disprove it; but we give the above for what it is worth.

Fine Pitched Threads for Bolts and Nuts.

Maj. W. R. King, U. S. A., recently read a paper before the American Institute of Mining Engineers, from which it appears that there was a material gain in strength by using a pitch about twice as fine as the present standards. His conclusions are:

"The importance of the results is evident from the fact that a net increase of about 20 per cent. in the statical strength of bolts and 150 per cent. in their resistance to sudden strains can be made by simply using finer threads, and at least 40 per cent. of the iron in the head and nut can be saved by making them that much lighter. It is certainly a mystery why manufacturers will persist in throwing away metal and labor in making coarse threads which cut away the bolts unnecessarily at their weakest point, and I can only account for it upon the theory that the present scales have been inherited from the coarse blacksmith work of former years, which has been carried into our modern and more refined practice to avoid changing taps and dies."

He adds the following summary of tests of a 1½-in. bolt:

	Pounds.
The standard bolts broke at an average strain of	76 655
Those with 12 threads at	62,991
Those with 18 threads yielded at	94,248

It will be noticed that the latter were just on the point of breaking when the nut pulled off.

Mean Results.

	6 threads.	12 threads.	18 threads
Relative tensile strength	1	1.21	1.23
Stretch	.05	.06	.08
Relative work	.025	.0726	.0984
Or	1	2.9	4

The advantages sought are:

1. At least 20 per cent. additional statical strength.
2. Three or four times the strength to resist impact.
3. Easier to cut.
4. Less liable to work loose.
5. In many cases it will take the place of upset or enlarged bolt-ends.
6. In such cases it would have the advantage of filling the hole, or, rather, it would avoid the necessity of making the holes larger than the body of the bolts.
7. A saving of 50 or 60 per cent. in weight of heads and nuts; also in cost.
8. Bolts may be placed closer to angles in structures without chipping out for head or nut.

The disadvantages would be:

1. Cost of changing taps and dies.
2. Additional time required to put on or remove nuts, which, of course, is hardly worthy of notice.
3. In case of bolts frequently removed, there would, of course, be a greater loss in strength from wear and rust of surfaces of thread. We have seen, however, that this wear must go on until the No. 12 thread is as fine as the No. 18 thread before the nut will strip. In some cases, like the bolts that secure the cylinder heads of a steam engine, it will probably be best to retain a coarse thread.

The more injurious effects of slight injuries to the threads hardly seem to be sufficiently dwelt upon in this paper.

Interlocking Signal Train Protection Bar.

Engineering illustrates a simple and practical precaution against the risk of accidents at stations and junctions by the errors of signalmen, by which a signalman is prevented from lowering his signals for a second train to enter a station while it is already occupied by a standing train. No additional lever in the signal cabin is required, the protection bar being worked by the same lever that works the home signal. The weight of the train holds down a bar alongside the rails so as to lock the proper parts of the apparatus.

A protection bar of this kind is not a novel idea, except in the details, which seem to be well worked out, and in the manner of actuating it, which is in this case by wire, as there is in use on the New York Division of the Pennsylvania Railroad, at the Germantown Junction interlocking apparatus, a bar used for identically the same purpose, *i. e.*, to prevent the leverman or operator from giving a clear signal to a train while another train, fouling the junction track, is standing at the station. This bar is operated by pipe connections in the same manner as switches. The same purpose is also accomplished by the use of electricity, with the one advantage of being able to cover a longer piece of track than could be covered with a bar, which in some cases, owing to its short length, would fail to lock the signal, owing to a short train or light engine not standing on it.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Northern Pacific, annual meeting, at the office in New York, Sept. 17.

Ohio & Mississippi, annual meeting, at the office in Cincinnati, Oct. 8. Transfer books close Sept. 12.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Burlington & Quincy, 2 per cent., quarterly, payable Sept. 15, to stockholders of record on Aug. 15.

Iowa Falls & Sioux City (leased to Illinois Central), 1¾ per cent., quarterly, payable Sept. 1, to stockholders of record on Aug. 15.

North Pennsylvania (leased to Philadelphia & Reading), 2 per cent., quarterly, payable Aug. 25, to stockholders of record on Aug. 12.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be as follows:

The *Master Car-Painters' Association* will hold its annual convention in Toronto, Ont., on Wednesday, Sept. 2.

The *National Association of General Passenger & Ticket Agents* will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.

The American Institute of Mining Engineers will hold its fall meeting in Halifax, Nova Scotia, beginning on Wednesday, Sept. 16.

The *Brotherhood of Locomotive Firemen* will hold its annual convention in Philadelphia, on Monday, Sept. 21.

The *General Time Convention* will meet at the Grand Pacific Hotel, in Chicago, on Thursday, Oct. 8.

The *Southern Time Convention* will meet at the National Railway Exchange, No. 46 Bond street, New York, on Wednesday, Oct. 14.

National Association of General Passenger and Ticket Agents.

The following from Secretary A. J. Smith is dated Cleveland, O., August, 1885:

"The semi-annual meeting of this Association will be held at New York, at the Windsor Hotel, Tuesday, Sept. 15, at 11 o'clock a. m. Blank credentials will be furnished new members at the meeting."

Baltimore & Ohio Employes' Relief Association.

The July sheet of this association shows payment of benefits during the month as follows: Main Stem, Transportation Department, 118; Machinery Department, 143; Road Department, 103; Baltimore & Philadelphia, 3; Trans-Ohio divisions, 167; Pittsburgh Division, 73; physicians' bills, 123; total, 730.

The following circular has been issued:

"The business of the Relief Association in its loan and building features has assumed such dimensions as to necessitate a more systematic method in certain particulars, in order to secure the greatest economy in time for the Building Inspector of the Association. The latter, under the constitution and rules, is required to inspect and report on all property on which loans are sought to be obtained, in order to submit the matter intelligently to the board of trustees. It is obvious that, in view of the vast territory over which the business operations extend, this officer cannot visit the different places where inspections are to be made more than once a month; consequently all applications should be placed in his hands at such a time as will enable him to give them proper attention prior to the meeting of the board of trustees. In order to obtain this result it has been concluded to require, after Aug. 1, 1885, that all applications for loans shall be sent in not later than the 15th day of each month. Applications received thereafter will not be acted upon until the second meeting of the board following that date.

"Applications for loans must be made upon the blanks furnished for that purpose, which can be obtained from any depositary, or the Secretary of the Relief Association, and all the information asked for in this blank must be supplied, so far as practicable."

American Institute of Mining Engineers.

Prof. R. W. Raymond, Secretary of the Institute of Mining Engineers, has issued the following circular under date of Aug. 15:

"As announced in Circular No. 6, the next meeting of the Institute will be held at Halifax. Communications should be addressed to Mr. Edwin Gilpin, Inspector of Mines, Halifax, Secretary of the Local Committee. Members are advised to write early to Mr. Gilpin concerning hotel accommodations.

"The following provisional programme is announced:

"*Wednesday, Sept.* 16.—Opening session in the morning, adjourning early to permit inspection of the city. Sessions afternoon and evening. (The lateness of the arrival of the St. John train Tuesday evening has caused this postponement of the opening session to the next morning.)

Thursday, Sept. 17.—In the morning, an excursion to the Montagu gold mines; in the afternoon, closing session; in the evening, a dinner given by the citizens of Halifax.

Friday, Sept. 18.—Three excursions are proposed, as follows:

"1. To Windsor (plaster-quarries), Grand Pre, Annapolis

and St. John, arriving at St. John Saturday p. m. If the tide is favorable, parties preferring to visit Springhill can go from Windsor to Parrsboro, thence by rail to Springhill, and to St. John Saturday night.

"2. To Londonderry Iron Works, thence by special train to Springhill, thence either to St. John (arriving Saturday morning) or to the Joggins on Saturday, reaching St. John Sunday morning.

"3. To Pictou coal-field, returning to Truro Friday evening; to Londonderry, Saturday evening; thence to Springhill, and to St. John, by night train, arriving Saturday morning.

"4. An excursion to Cape Breton is also proposed, which would occupy the whole of the following week, the party probably reaching St. John Sunday morning, Sept. 27. It is particularly important that those desiring to take this excursion should notify Mr. Gilpin at once, that suitable arrangements may be made.

"With regard to *all* the excursions named above, it is desirable that members should notify Mr. Gilpin of their choice. Arrangements will be made by which any who desire to make more than one of the excursions can be accommodated if they are willing to stay over into the following week.

"A special circular concerning railway rates will be sent from this office, together with the necessary certificate, to all who notify the Secretary of their intention to attend the meeting."

A number of papers have already been announced to be read at this meeting. The Secretary's office is at No. 13 Burling Slip, New York.

Western Association of General Passenger & Ticket Agents.

A quarterly meeting of this Association was held in Milwaukee, Wis., Aug. 12. There was a large attendance, but no special matter was brought up, and only the usual routine business was transacted. It was decided to hold the next meeting in Cincinnati, Nov. 19.

On the following day the members went on an excursion to Oconomowoc, on invitation of the Chicago, Milwaukee & St. Paul Co., returning on Aug. 14.

The Utica Canal Conference.

A conference was held in Utica, N. Y., Aug. 19, at which delegations were present from New York, Buffalo, Utica, Syracuse, Rochester, Albany and a number of smaller towns along the Erie Canal. Ex-Gov. Horatio Seymour presided and a number of speeches were made. The following platform was adopted by the conference:

"The delegates in convention assembled, representing the various commercial and agricultural interests of the state of New York, hereby declare:

"1. That it has ever been the policy of the people of this state to maintain adequate facilities for transportation of freight from the great West and the Canadas to the seaboard by means of a cheap water route; that this policy should not be abandoned, but that the canals of the state should be forever preserved and maintained free, and in such condition as to satisfy the wants of commerce.

"2. That in pursuance of such policy the interests of the entire state demand that the canals shall be improved by lengthening the locks and deepening the channel.

"3. That preservation and improvement of our canals be urged on the attention of the Legislature by the Executive Committee of this convention."

The Chair appointed as this Executive Committee, which was instructed to print and thoroughly distribute the platform and literature informing the public of the objects of the conference: Orlando B. Potter, W. H. Webb, John F. Henry, A. B. Miller, of New York; De Witt C. Littlejohn, of Oswego; Edward Wemple, of Fultonville, and J. A. Heines, of Rochester. To the committee were added Horatio Seymour, Arthur W. Hickman and Frank S. Gardiner.

ELECTIONS AND APPOINTMENTS.

Batesville & Brinkley.—The following circular from W. J. Thompson, General Manager of this road, is dated Little Rock, Ark., Aug. 10: "Mr. James Harrington is hereby appointed General Superintendent of the Batesville & Brinkley Railroad, vice Mr. E. Summerfield, resigned, with office at Brinkley, Ark. All agents and employés of the company will be subject to his orders and make their reports through him. Until further orders he will also discharge the duties of General Freight and Ticket Agent of said company."

Canada, La Crosse & Southwestern.—This company has elected officers as follows: President, F. A. Roziene, Charles City, Ia.; Vice-President, W. T. Price, Black River Falls, Wis.; Secretary, A. R. Spriggs, Charles City, Ia.; Treasurer, G. C. Hixon, La Crosse, Wis.; Executive Committee, F. A. Roziene, W. T. Price, Joseph Clark, G. R. Montague and B. W. Stevens.

Chicago, Burlington & Northern—Mr. A. E. Touzalin is President of this new company, which is to build the Chicago, Burlington & Quincy's line to St. Paul, and has his office in Chicago. Mr. W. H. Holcomb has been appointed General Manager, with office at La Crosse, Wis. Mr. Holcomb was recently General Superintendent of the Chicago & Iowa road.

Chicago & Iowa.—Mr. H. D. Judson is appointed Acting General Superintendent, with office at Rochelle, Ill., in place of W. H. Holcomb, who has gone to the new Chicago, Burlington & Northern road.

Denver & Rio Grande Western.—Mr. W. M. Rank is appointed General Agent in San Francisco in place of N. B. Eddy, resigned.

Fargo, Moorhead & Northeastern.—This new company has its office in Moorhead, Minn. The directors are A. H. Baker, D. H. Fisk, Otto Kunkle, John M. Martin, F. Puhler and R. A. Wilkinson.

Freeport, Ironton, Mauston & Northern.—The directors of this new company are: C. E. Bahn, Lime Ridge, Wis.; J. H. Menoun, Lemonweir, Wis.; E. Blakeslee, Peter Croak, Ironton, Wis.; P. R. Briggs, J. H. Stewart, F. Wisner, Mauston, Wis.

Kentucky Central.—Mr. Epes Randolph is appointed Chief Engineer and General Roadmaster, with office in Covington, Ky. He was formerly on the Alabama Great Southern, and more recently General Manager of the Allegheny Iron Mining Co., of Virginia.

Minneapolis, Lyndale & Minnetonka.—At the annual meeting, in Minneapolis, Minn., August 14, the following directors were chosen: P. S. Mackay, C. A. Pillsbury, J. K. Sidle, S. S. Small, E. A. Street. The board elected S. S. Small, President and General Manager; C. A. Pillsbury, Vice-President; P. S. Mackay, Secretary; J. K. Sidle, Treasurer.

Northwest Central.—At a meeting held in Toronto, Ont., recently, the following officers were chosen: President, James Beaty; Vice-President, L. A. Billy; directors, Robert Beaty, Robert Hay, W. Kennedy, Philip Low, John Norquay, L. J. Riopel, Charles H. Tupper.

Port Jervis & Monticello.—Mr. James M. Warner has been appointed Superintendent in place of M. V. Heller, resigned; office at Port Jervis, N. Y. Mr. Warner is now Chief Dispatcher of the Delaware Division of the New York, Lake Erie & Western road.

Tavares, Orlando & Atlantic.—The following circular from L. P. Westcott, President, is dated Orlando, Fla., July 28:

"The Tavares, Orlando & Atlantic Railroad Co. assumes this day control of the railroad line heretofore operated by the Tropical Construction Co., Orlando to Tavares. All accounts prior to July 28 will be reported to and will be settled by the Tropical Construction Co. All accounts from and after July 28 inclusive will be reported to and adjusted by the Tavares, Orlando & Atlantic Railroad Co.

"F. C. Hand is hereby appointed General Superintendent of the Tavares, Orlando & Atlantic Railroad Co., and will have charge of all matters pertaining to the general business of the company, reporting to the President. Charles V. McKinlay is hereby appointed General Freight and Ticket Agent of the Tavares, Orlando & Atlantic Railroad, and will have charge of all matters pertaining to the freight and ticket business of this company. All accounts pertaining to the freight and ticket business should be forwarded to him at Orlando. The General Freight and Ticket Agent will report to the President."

Virginia, Tennessee & Georgia Air Line.—The following circular from Mr. Henry Fink, General Manager of this line (including the East Tennessee, Virginia & Georgia, the Norfolk & Western and the Shenandoah Valley roads) is dated Knoxville, Tenn., Aug. 10:

"Mr. B. W. Wrenn is hereby appointed General Passenger Agent of the Virginia, Tennessee & Georgia Air Line, to take effect Sept. 1, 1885. His office will be at Knoxville, Tennessee."

Mr. Wrenn was for a number of years General Passenger Agent of the Western & Atlantic, and for some time past has been General Passenger Agent of the East Tennessee, Virginia & Georgia, which office he will still retain.

PERSONAL.

—Mr. E. Summerfield has resigned his position as General Superintendent of the Batesville & Brinkley road.

—Mr. M. V. Heller has resigned his position as Superintendent of the Port Jervis & Monticello Railroad.

—It is reported that Gen. Adna Anderson has resigned his position as Chief Engineer of the Northern Pacific Railroad, to take effect Sept. 1. He will retire because the work of location and new construction on the road is substantially closed.

—Mr. Robert F. Fairlie, well known as the first prominent advocate of the narrow-gauge system and the designer of the Fairlie engine, died at his residence, Woodlands, Clapham, England, July 31, aged 54 years, from fever contracted in Venezuela some years ago.

—Col. Thomas Dodamead died in Richmond, Va., Aug. 14, aged 68 years. He was a native of Philadelphia, but had resided in Virginia nearly 50 years. He early entered upon railroad work and had served at different times on nearly every road in Virginia. He rose gradually to be General Superintendent of the Richmond & Danville, holding that office for a number of years. Subsequently he was General Superintendent of the Greenville & Columbia road, and retired from active work when he left that line, some three years ago. Last spring, however, he was persuaded to take charge of the Danville & New River road as General Superintendent, and held that office at the time of his death.

—Mr. Wilson W. Morrison, who died at Lock Haven, Pa., Aug. 15, was born at Jersey Shore, Pa., June 6, 1821, his father, Gen. Wm. Morrison, being, some years later, one of the founders of the town of Lock Haven. The young man was educated as a surveyor, and though he afterward studied law, he never practiced, but returned to his first profession. He took a leading part in the engineer corps that located and constructed the extension of the North Branch Canal, the Portage Railroad (both state works) and the Philadelphia & Erie Railroad. He afterward became an extensive contractor, engaged in the construction of various roads and other public works and was the senior of the firm that built the Beech Creek, Clearfield & Southwestern Railroad from the mouth of Beech Creek to the Hogback Mountain, including the tunnel through the latter. He was held in high esteem in the foregoing occupations, and as a contractor was noted for his energy and the substantial character of his work. He was highly esteemed by his friends both for his strict honesty and for his kindly and benevolent disposition.

—We are indebted to the *Engineering News* for the following: "Samuel W. Mifflin, one of the pioneers and leaders among American civil engineers, died at his residence, at Wayne Station, Pa., July 26, 1885, in the 81st year of his age. His father, Jonathan Mifflin, was connected with Washington's military family during the Revolution and was a personal friend of La Fayette and other prominent men of the period; his mother was Susanna Wright, of the old English Quaker family of the Susquehanna, the founders of Wrightsville and prominent in colonial affairs. He was thus a representative of two of the very oldest directly English families in Pennsylvania. Mr. Mifflin began his career as an engineer on the old Columbia Railroad, the parent of the present corporation known as the Pennsylvania Railroad. Afterward he held various positions of trust and high professional character on the New York & Erie, the Boston & Portland and the Philadelphia & Reading and Lebanon Valley railroads. He located and constructed a considerable portion of the Pennsylvania Railroad in the Alleghenies; the famous Horse Shoe Curve and the Summit Tunnel being practically his location. He was for a number of years connected with the main Pennsylvania line in the location and building of numerous branch railroads; his last work in this connection being the location of the seaboard route to Long Branch. Just after the civil war he was appointed by the United States government engineer in charge of harbor improvements on lakes Erie and Michigan. His last professional work was the location of a railroad in West Virginia for a Philadelphia company. Among the older members of the engineering profession Mr. Mifflin had a well-earned reputation as a locating engineer, few if any excelling him in this important branch of the profession. Personally, he was a close and comprehensive thinker, and was possessed of a highly organized mental and spiritual temperament. He achieved a quiet fame in intellectual paths removed from his professional life, and was a warm friend of the oppressed. In the days before the war he personally assisted many a weary slave from the South northward on his way to freedom, and one of the stations on the famous and now almost forgotten 'underground railroad' was on his farm at Wrightsville."

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Seven months to July 31:				
Ala. Gt. South...	$589,702	$601,244	D. $11,542	1.9
Char., Col. & A..	425,006	398,774	I. 26,232	6.5
Cin., N. O & T. P.	1,430,606	1,436,317	D. 5,721	0.4
Cleve., Ak. & Col.	270,770	268,115	I. 2,655	1.0
Col. & Greenville	349,470	329,734	I. 19,736	5.9
Fla Ry & N Co.	570,265	586,630	D. 16,365	2.8
Ft. Worth & Den.	259,740	284,465	D. 24,725	8 7
Georgia Pacific..	347,455	300,872	I. 46,583	15.5
Gulf, Col. & S. F.	734,326	896,907	D. 172,581	19.2
Illinois Central:				
Ill. lines.. ..	3,517,788	3,337,757	I. 180,031	5.4
Southern Div...	2,336,933	2,150,056	I. 186,877	8.7
Iowa lines ..	878, 20	928,707	D. 50,187	5.4
Ind., Bloom & W	1,258,645	1,250 463	I. 8,182	0 6
Marq., H. & O..	408,413	484 838	D. 76,425	16.5
Mem. & Charles.	698,029	757 797	D. 59 768	7.9
Nash., C. & St.L.	1,192,885	1,332,656	D. 139,771	10 5
Net earnings...	480,210	569,973	D. 89 773	15.7
N. O & Nor'east.	361,644	219,010	I. 142 634	65.1
N. Y., Ont. & W..	1,015,000	1,040,699	D. 25,699	2.5
Ohio Southern...	246,829	241,228	D. 14,399	5 9
Rich. & Dan	2,127,850	2,076,025	I. 51,825	2.5
St. L., A. & T. H.:				
Main Line ..	647,140	753,308	D. 105,868	14.0
Belleville Line.	397,596	422,876	D. 25,280	6.0
St. L., Ft. S. & W	336,826	275,646	I. 61,180	22.2
Texas & St. L .	526,038	443,368	I. 82,670	18.6
Vicks. & Mer....	227,694	258,158	D. 30,464	11 8
Vick., Shre. & P.	178,512	73,506	I. 105,006	142 9
Va. Midland	822,728	894,010	D. 41,282	4.8
Western N. C	244,859	226,655	I. 18,204	8.1
Six months to June 30:				
Bur., C. R. & No.	$1,413 918	$1,278,743	I. $135.175	10.5
Net earnings...	375,679	355,919	I. 19 760	5.2
Des M. & Ft. D...	169,287	155 990	I. 13,297	8.3
Net earnings...	37,154	38,592	D. 1,438	3.7
Gal., Ha. & S. An	1,397,384	1,293,488	I. 103 896	8.0
Net earnings...	608,953	231,384	I. 377,969	164.0
Louisiana West..	287,812	227 800	I. 60,012	26 3
Net earnings...	14 ,245	92,256	I. 56,989	61.9
Mem. & Charles.	611,324	655,101	D. 43,777	6.6
Net earnings..	50,807	109,125	D. 118,318	70 0
Morgan's La. & T	1,859,006	1,646,581	I. 212,425	12 9
Net earnings...	563,738	473,835	I. 89,903	18.8
Tex. & N. Orl'ns.	449,347	401,378	I. 47.969	17.8
Net earnings...	105,812	63,115	I. 42,697	67.7
Month of June:				
Bur., C R. & No.	$230,451	$206,418	I. $24.033	11.6
Net earnings...	54,870	46,8 1	I. 8,009	17 0
Des M. & Ft. D..	27,328	23 726	I. 3 602	15.1
Net earnings...	7,010	5,431	I. 1,579	29.2
Gal., H. & S. An.	230,161	126,098	I. 104,063	82.6
Net earnings...	90,552	*30,388	I. 120,940	....
Louisiana West..	43.373	14.663	I. 28,710	195.3
Net earnings..	21,256	*2,533	I. 23 789	....
Mem & Charles.	81,721	117.705	D. 35,984	30.5
Net earnings...	25,234	21 394	I. 3,840	17.9
Morgan's La. & T.	255,584	208,644	I. 46,940	22.5
Net earnings...	46,536	50,703	D. 4,167	8.2
Tex. & N. Orl'ns.	73,728	21,789	I. 51 939	238 3
Net earnings...	29,010	*17.884	I. 46,894	....
Month of July:				
Ala. Gt. South...	$70.092	$73,900	D. $3,808	5.1
Char., Col. & A..	45,982	40,879	I. 5,103	12.4
Cin., N. O. & T. P.	222,929	226,702	D. 3,773	1.7
Cin., W. & Balt..	.....	.....	.....	.....
Cleve., Ak. & C..	44,251	41,213	I. 3,038	7.5
Col. & Greenville.	31,682	30,880	I. 802	2.6
Fla. Ry. & N. Co.	66,640	60,861	I. 5,779	9.5
Ft. Worth & D..	48,344	50,359	D. 2,015	4.0
Georgia Pacific..	42,233	40,650	I. 2 583	6.3
Gulf, Col. & S. F.	135,421	126,432	I. 8,989	7.1
Illinois Central:				
Ill. lines.. ..	496,486	464,185	I. 32,301	7.0
Southern Div..	223 ,005	240 049	D. 18,044	7.5
Iowa lines .	128 799	127,718	I. 1,081	0 8
Ind., Bloom. & W.	167 665	173,188	D. 5,523	3.2
Marq., H. & Ont	124,599	140 633	D. 16,034	11.4
Nash., C. & St. L.	165,667	187 475	D. 21,808	11.7
Net earnings...	68,121	78,873	D. 10,752	13.6
N. O. & Nor'east.	33,504	25,510	I. 7,994	31 4
N. Y., Ont. & W..	194,643	195,176	D. 533	0.3
Ohio Southern...	25,054	35,356	D. 10,302	29.4
Rich. & Dan	272,277	250,923	I. 21.354	8 5
St. Jo. & West..	61,246	69,326	D. 8,080	11.7
St. L., A. & T. H.:				
Main Line..	81,152	90 095	D. 8,943	9.9
Belleville Line.	52,288	44 596	I. 7.692	17.1
St. L., Ft. S. & W.	48,740	42,309	I. 6 431	15.3
Texas & St. L...	87,708	79 761	I. 7.947	9.9
Vicks & Mer	29,574	32,174	D. 2,600	8.1
Vick., Shre. & P.	25,194	14 360	I. 10,834	77.6
Va. Midland	130.570	131,305	D. 735	0.5
Western N C....	38,833	35,719	I. 3,114	8.6
Second week in August:				
Chi. & Alton ..	$190 071	$236.042	D. $45.971	19 5
Chi., Mil. & St. P.	379,000	389.564	D. 10,564	2.7
Chi. & Nor'west.	390,060	420,000	D. 30,000	7.2
Long Island.....	99,306	90,349	I. 8,957	9.9
Mil., L. S. & W..	27,900	22,500	I. 5 400	24 0
Roch. & Pitts....	22,929	25,412	D. 2,483	9.8
St. L. & San F...	79,100	101,400	D. 22,300	22.1

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending August 8 are reported as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Anthracite.....	612.131	847.838	D. 235,707	27.7
Eastern bituminous	150,440	179.452	D. 29 022	16 2
Coke.....	53,853	58 096	D. 4,243	7.3

An improved demand for anthracite is reported, but prices continue to rule very low, and there is not much prospect of improvement. The proposal to restrict production further has fallen through altogether, at least two of the companies having refused to join in it, and there is, apparently, no expectation that it will be brought up again.

Actual tonnage passing over the Pennsylvania & New York road for the eight months of its fiscal year from Dec. 1 to Aug. 1 was:

	1885.	1884.	Decrease.	P. c.
Anthracite...	763,567	812.275	48,708	6.0
Bituminous..... ...	156,833	208,174	51,341	24.7
Total	920,400	1,020,449	100,049	9.8

The larger part of the anthracite coal carried comes from the Lehigh Valley road, of which this line is an extension.

The 40,000 acres of land in the Snowshoe region recently purchased by the Lehigh Valley Railroad is being rapidly developed by that company. These lands are now producing and shipping an amount daily equaling 350,000 tons per year, the shipments being made over the Bald Eagle Valley road to Lock Haven, where they are transferred to the Philadelphia & Erie tracks and carried to Sunbury, thence by the Northern Central to Mt. Carmel, where they are transferred to the Lehigh Valley. The company has also erected 150 coke ovens on the Snowshoe lands, the product of which is disposed of to the different manufactories along the Lehigh Valley road.

Pennsylvania Railroad coal tonnage for the week ending Aug. 15 was :

	Coal	Coke.	Total.	1884.
Line of road.....	155,879	50,548	206,427	193,142
From other lines	82,833	566	83,399	76,302
Total.....	238,712	51,114	289,826	269,444
Year to Aug. 15....	6,636,644	1,584,565	8,221,209	8 177,730

Increase for the week, 20,382 tons, or 7.5 per cent.; increase for the year, 43,479 tons, or 0.5 per cent.

Cumberland coal shipments for the week ending Aug. 15 were 57,316 tons. Total to Aug. 15 this year, 1,654,375 ; last year, 1,703,932 ; decrease, 49,557 tons, or 2.9 per cent.

Anthracite coal tonnage for July and the seven months to July 31, as reported by Mr. John F. Jones, the Official Accountant, was as follows, the statement including the entire production of anthracite coal, excepting that consumed by employés and for steam and heating purposes about the mines :

	July.		Seven months.	
	1885.	1884.	1885.	1884.
Phila. & Reading.....1,057,461		954,777	5,785,454	5,662,308
Lehigh Valley.....	562,482	488,722	2,918,038	3,079,365
Del., Lack. & West...	455,110	443,847	2,382,987	2,682,935
Del. & Hud. Canal Co...	278,187	281,949	1,589,154	1,704,499
Pennsylvania R. R....	261,983	297,427	1,812,489	1,741,857
" Coal Co...	136,145	111,520	704,966	701,659
N. Y., L. E. & W.....	49,439	24,373	309,241	189,245
Total.....	2,801,007	2,662,615	15,502,329	15,761,868

Increase for the month, 198,392 tons, or 7.6 per cent.; decrease for the year, 259,539 tons, or 1.7 per cent.

The division of tonnage for the seven months was as follows, comparison being made with last year, and also with the allotment agreed on for the present year :

	Allotment.	1885.	1884.
Philadelphia & Reading..... ...	38.85	37.3	35.9
Lehigh Valley.....	19.60	19.1	19.5
Delaware, Lackawanna & Western. ..	16.05	15.4	17.0
Delaware & Hudson Canal Co.....	11.00	10.1	10.8
Pennsylvania Railroad Co.....	8.00	11.7	11.1
Pennsylvania Coal Co.....	5.00	4.5	4.5
New York, Lake Erie & Western.....	1.50	1.9	1.2
Total	100.00	100.0	100.0

The stock of coal on hand at tidewater shipping points, July 31, 1885, was 734,700 tons; on June 30, 1885, 582,163 tons; increase, 152,537 tons, or 26.2 per cent.

Cotton.

Cotton movement for the week ending Aug. 14 is reported as follows, in bales :

Interior markets :	1885.	1884.	Inc. or Dec.	P.c.
Receipts..	2,518	1,383	I. 1,135	82.2
Shipments...	3,707	3,566	I. 141	4.0
Stock, Aug. 14.....	20,066	18,366	I. 1,700	9.3
Seaports :				
Receipts....	3,125	2,898	I. 227	7.8
Exports	21,236	15,504	I. 5,732	37.0
Stock, Aug. 14	168,831	168,707	I. 124	0.1

The total movement from plantations for the crop year (from Sept. 1) to Aug. 14 is estimated at 5,616,570 bales, against 5,349,838 last year, 6,964,344 in 1882-83, and 5,345,530 bales in 1881-82.

Lumber Rates.

The demand for a change in the lumber rates to the West by making the rate from Chicago to Council Bluffs or Omaha 18 cents has been finally agreed upon. The new rates to Council Bluffs and Omaha will be as follows in cents per 100 lbs. :

From—	Rates.
Detroit and Toledo	24½
Chicago and points common therewith, and Peoria	18
Clinton, East Clinton and Fulton.....	16
Moline, Rock Island, Davenport and Muscatine	14½
Burlington, Fort Madison, Montrose and Keokuk.....	13½
Quincy, Hannibal and Louisiana.....	12½
Alton, St. Louis and East St. Louis	11½

The new rates took effect on Aug. 20.

Central Traffic Association.

The Central Traffic Association met at Commissioner Fink's office, in New York, last week, the meeting closing Aug. 14. After a general discussion of the situation the first actual business transacted was the election of a commissioner. Hugh Riddle, formerly of the Chicago, Rock Island & Pacific Railroad, was urged to reconsider his former declination, but firmly refused the office, and Orland Smith, President of the Cincinnati, Washington & Baltimore, was selected. For Assistant Commissioner, J. W. Midgeley, formerly Commissioner of the Southwestern pool, was chosen.

With these officers chosen, although Mr. Smith, who was present, declined to say whether or not he would accept, the Association quickly dispatched its business, the outcome being a general agreement to stand by the Chicago, St. Louis, and all the pools from the interior points, which, it was further agreed, should be instituted on the basis of gross money earnings, the settlements to date from Aug. 1.

No basis of percentages was agreed upon at the meeting, a committee being appointed to name arbitrators to determine the percentages in case the roads cannot agree upon these themselves. A second committee consisting of J. N. McCullough, Pennsylvania Co.; Frank Harriott, Baltimore & Ohio; George H. Valliant, New York, Pennsylvania & Ohio; L. J. Seargeant, Grand Trunk; and John Newell, Lake Shore, representing the immediate Chicago connections of the trunk lines, was appointed to confer with them as to such further arrangements regarding east-bound traffic as the new money pool may make necessary.

Finally the Association resolved to restore and reaffirm the east-bound tariff fixed July 13, the basis of which is a 20-cent rate in grain from Chicago to the seaboard, and this tariff will go into effect on Monday, Aug. 17. The meeting adjourned subject to the call of Chairman Ingalls.

Southern Freight Rates.

A Louisville dispatch says that the Louisville & Nashville Co. has decided to charge an arbitrary rate on all business going from that city to points beyond Knoxville by the Jellico route, and that in consequence of this action the East Tennessee, Virginia & Georgia has withdrawn its agent and is taking no freight from Louisville. This action may lead to renewed trouble.

Texas Traffic Association.

The pooling agreement, it is stated, has finally been signed by Jay Gould for the Missouri Pacific and the Texas and Pacific lines; C. P. Huntington for the Southern Pacific lines; B. G. Clarke for the Houston & Texas Central, and George Sealey for the Gulf, Colorado & Santa Fe. As finally drawn, the agreement is for five years, with the right reserved to each line to withdraw after one year on 60 days' notice. The pool is to take effect from Sept. 1.

Passenger Rates.

On Aug. 16 both the New York Central and the West Shore restored their local passenger rates, which have been 1 cent per mile for some time, to the former standard of 2 cents per mile. On rates from New York the 2 cents per mile is in force as far as Utica, but beyond that point there is some reduction from the old figures, the fare to Syracuse being $5.50 ; to Rochester, $6, and to Buffalo, $6.50. All local rates between stations are restored to the old figures.

This action of the New York Central and the West Shore was followed by a meeting of passenger agents in New York, Aug. 19, all the lines except the Pennsylvania being represented. A resolution to make the first-class rate from New York to Chicago $13.50 by the New York Central and $12 by the other lines failed to pass on account of some differences as to the allowance of the differential on business to points beyond Chicago.

RAILROAD LAW.

Heavy Verdict for Injury to an Employe.

The largest verdict for personal damages ever given to an employé was recently given in the District Court of Wyandotte County, Kan., when the jury brought in a verdict for $50,000 for the plaintiff in the suit of Jared Cone against the Atchison, Topeka & Santa Fe Co. The Topeka *Commonwealth* says of this case:

"This is the second trial of the case. It was first tried last winter, when the jury hung, ten standing for plaintiff and two for the company. This time the jury were a unit from the start. Gone was the rear brakeman on a passenger train coming east on the night of Dec. 5, 1883. The train stopped at Newton for supper, where a car was put into the train. The night was rainy and dark, and as Cone was on the railing between the sleeper and coach east of it, fixing the bell cord, Corcoran, the conductor, without waiting to know whether the train was in condition to go, and without warning to Cone, signaled the train to pull out. Cone was thrown between the cars and was carried or dragged under the train 800 or 1,000 ft., and was found by the track a few moments after in an insensible condition, his coat badly torn, his pants and drawers torn to shreds, his skull fractured, his right arm broken at the wrist, the palm of his right hand torn out, the back of it scarred and mutilated, so that a portion had to be amputated, his right leg crushed so that it had to be taken off below the knee, and the flesh torn off his left side. * *

"One hundred and thirty-six questions of fact were propounded to the jury by the railroad company, and which they struggled with until they answered them. The jury would have been out but a short time had they not been delayed by making answer to these questions. It is said that this is the biggest verdict ever returned in the United States in a personal damage case. The argument of counsel occupied about 18 hours, one of the counsel for plaintiff occupying nearly half that time in opening the argument. A motion will be made for a new trial."

OLD AND NEW ROADS.

Alabama Great Southern.—In the New York Supreme Court, Aug. 18, attachments to the amount of $33,613 against any property of this company in the state, were granted at the suit of the Union Rolling Stock Co. and the Bristol & South Wales Wagon Co. The suits were brought to recover rental due on 500 cars.

In Chattanooga, Aug. 18, the men employed in the company's shops held a meeting and resolved to strike unless the back wages due them are paid within a short time. It was stated that there were now three months' pay due them.

Baltimore & Ohio.—A number of contracts have been awarded for work on this company's line in Philadelphia. The principal contractors are Ryan & McDonald and Drake & Stratton, of New York; J. J. Ryan and Neveling & Co., of Philadelphia, and C. D. Langhorne, of Virginia. Bids have been received on nearly all the remaining work, but the contracts have not been awarded yet.

Bangor & Portland.—This company has made a traffic agreement with the Pennsylvania Railroad Co., and the latter company has given up the construction of its proposed branch to the slate quarries about Bangor, Pa., which is rendered unnecessary by this agreement.

Belvidere Delaware.—Notice is given that the second-mortgage bonds of this company, which mature Sept. 1, will be paid off on that date at the Pennsylvania Railroad office in Philadelphia. There are $499,500 of these bonds outstanding.

Boston, Hoosac Tunnel & Western.—This company's statements to the New York Railroad Commission give the following figures for the quarter ending June 30 and the nine months of the fiscal year from Oct. 1 to June 30 :

	Quarter.	Nine months.
Earnings	$117,885	$354,500
Expenses	127,774	403,176
Deficit.....	$9 919	$48 676
Interest, rents, etc	38,096	88,096
Total deficit	$48,015	$136,772

The balance sheet for June 30 shows $2,000,000 funded debt ; $1,818,132 loans and bills payable and $324,677 accrued interest, accounts and balances payable.

Boston & Lowell.—The Boston *Herald* says : "The freight yard of the Boston & Lowell railroad, which faces on Leverett, Brighton, Lowell and Minot streets, has been for some time undergoing alterations which will greatly add to its convenience and make it one of the best freight yards in the city. The old brick structures at the south side of the yard, which for 40 or 50 years have been landmarks in that part of the city, have disappeared. These buildings were the Lowell house, standing on the corner of Leverett and Brighton streets; next to it the Concord house, in the upper part of which were the original freight offices of the company; then the Nashua house, and, near the bridge, the cotton house. All of these buildings, with the exception of the cotton house, were erected in 1842. The cotton house was built in 1835. The new freight houses, three in number, are long wooden structures, covered on the outside with tin, and divided into sections by tinned walls. No. 1 is 365 ft. long and 37 ft. wide; No. 2, 554 ft. long and 32 wide, and No. 3, 352 ft. long by 32 wide. On one side of each building a track is run, upon which the cars are loaded or unloaded. On the other side is a roadway for the delivery of freight. The yard, when finished, will be paved throughout, and surrounded by a painted brick wall about 12 ft. high."

The great storm of Aug. 14 stopped traffic on this company's Pemigewasset Valley Branch in New Hampshire, and for over a day the entire line was several feet under water. When the water subsided, however, the damage was found to be less than had been expected. The road-bed was washed out in several places, but the washes were all small and easily repaired.

Buffalo, New York & Philadelphia.—The Receiver paid on Aug. 15 the coupons which fell due June 1 on the second-mortgage bonds. The amount of these coupons was $17,500, and their payment prevents the beginning of foreclosure proceedings under the mortgage, which is on the main line from Buffalo to Emporium.

Cairo, Vincennes & Chicago.—The Court has granted an order authorizing the Receivers of this line to issue certificates to the amount of $1,300,000 for the purpose of laying steel rails and making other needed improvements, and of buying equipment for the road.

Central, of New Jersey.—Holders of New Jersey Southern bonds guaranteed by this company have begun suit to recover $90,000 overdue interest.

Chicago, Burlington & Quincy.—On the new branch of the Burlington & Missouri River from Republican, Neb., southwest to Oberlin, Kan., track is now laid from Republican southwest 41 miles, and the grading on the remaining 37 miles is nearly finished. This branch runs through a rolling country, requiring much cutting and filling, although none of the work is very heavy. It opens up a new section of country.

Chicago & Evanston.—This road will hereafter be operated as the Evanston Division of the Chicago, Milwaukee & St. Paul. It will be continued, however, as a separate organization. The Chicago & Evanston has been operated by the Milwaukee & St. Paul ever since it has been opened for business, but not as a part of the Milwaukee & St. Paul system, of which it will form a part hereafter.

Chicago & Great Southern.—The Court has authorized the Receiver of this road to borrow $50,000 to pay off back wages due employés of the road, and $80,000 in addition, to buy locomotives and make necessary repairs to rolling stock.

Cincinnati, Georgetown & Portsmouth.—Negotiations are pending for the sale of this road, now owned by the Brachman estate, to a syndicate of railroad men, including Messrs. M. E. Ingalls, W. W. Peabody, Orland Smith, Ralph Peters, Alexander McDonald and H. G. Roelker. The road is a narrow-gauge line, running from Cincinnati to Hamersville, 35¼ miles. The price asked is $140,000, and the purchasers expect to spend about $140,000 more in completing the line to Georgetown and buying new equipment.

Columbus & Rome.—It is now proposed to extend this road from its present terminus at Greenville, Ga., northward to Newnan, on the Atlanta & West Point road, thus completing a pretty direct line between Columbus and Atlanta. This extension is meant to head off the Georgia Midland project for a new road between those cities.

Delaware, Lackawanna & Western.—This company makes the following statement for its leased lines in New York state for the quarter ending June 30 :

	1885	1884.	Inc. or Dec.	P. c.
Earnings..... ....$1,128,095		$1,252,551	D. $124,456	9.7
Expenses...	538,012	706,206	D 168,194	23.7
Net earnings.	$590,083	$546,345	I. $43,738	8.0
Other income	703	....	I. 703	.....
Total....	$590,786	$546,345	I. $44,441	8.1
Rentals paid....	546,494	534,067	I. 12,427	2.3
Surplus	$44,292	$12,278	I. $32,014	247.5

The rentals paid include interest, taxes and dividends, all charges on the leased lines for the quarters.

Dubuque & Northwestern.—This company has bought 50 acres of land in Dubuque, Ia., for shops and yard purposes. The final location of the road has been completed, and the right of way is now being secured. The proposed line is from Dubuque northwest to a connection with the new Minnesota & Northwestern road.

Dunkirk, Allegheny Valley & Pittsburgh.—It is proposed to build a branch about 3 miles long to connect this road with Jamestown, N. Y. The people of that town have undertaken to raise $20,000 towards the cost of the branch.

Englewood Connecting.—The Court has dissolved two injunctions obtained to prevent this road from crossing the Chicago & Western Indiana tracks on the outskirts of Chicago. The road is a short line intended to make a cross-cut or connection between the Pittsburgh, Fort Wayne & Chicago and the Chicago, St. Louis & Pittsburgh roads.

Fargo, Moorhead & Northeastern.—This company has been organized to build a railroad from Moorhead, Minn., north by east through Ada and Fertile to Red Lake Falls, about 75 miles. A branch to Crookston, about 20 miles, is also proposed.

Florida Southern.—The track on the extension of this road on Aug. 19 reached the crossing of the South Florida road at Lakeland, Fla., 35 miles southward from the old terminus at Pemberton Ferry. This completes another connection with Tampa, over the South Florida road. The grading force is at work between Lakeland and Fort Meade on the extension southward to Charlotte Harbor.

Freeport, Ironton, Mauston & Northern.—This company has filed articles of incorporation to build a railroad from Dexterville Junction, Wis., by Necedah, Mauston and Ironton to Lone Rock, a distance of about 80 miles.

Houston, East & West Texas.—The Court at Houston, Tex., has authorized Receiver Howe to borrow $30,900 for the purpose of completing the work of tracklaying to the Sabine River. The Receiver appointed in Louisiana, Mr. Simon Levy, has also been authorized to complete the Shreveport end of the line to Logansport, where connection will be made with the Texas end of the road. Under these orders it is expected that the connection between Shreveport and Houston will be completed by October.

Houston & Texas Central.—Receiver Clarke is reported as saying that the next coupon on the first-mortgage bonds would not be paid. The earnings had been expended on the road, which is already in better condition than ever before. Mr. Clarke expects that the large cotton crop and the improvement in rates to be expected from the pooling of Texas business will soon put the company in condition to meet the demands of the bondholders.

Kentucky & South Atlantic.—The city of Bristol, Tenn., has voted to subscribe $50,000 in aid of this road, which is to run from Bristol through Stone Gap to a connection with the Kentucky system of roads.

Lake Erie & Western.—It will be remembered that recently notice was given that this road would be sold under a judgment obtained by George J. McGourkey for money advanced, the company having made no opposition. Certain stockholders, however, filed an intervening petition in the United States Circuit Court alleging that the judgment was taken for a debt due to the President and a majority of the directors of the company—in other words, that they had caused the company to confess judgment in their favor at Cleveland, and afterward had confessed the judgment at Indianapolis—and asking that it be set aside as fraudulent and the sale enjoined. The matter was argued before Judge Gresham, in Chicago, Aug. 15, and he held that the evidence showed that the judgment in fact belonged to the President of the road and certain of his co-directors, that it did not operate as a lien on the property which was then in the hands of the Receiver, and that the decree directing a sale for the payment of the judgment was erroneous because the company was insolvent and its property in the hands of the Court to be marshaled and administered according to the equities of the respective creditors. The President and his co-directors could not, in such a way, get an advantage over other creditors whose claims were equally equitable. On this intima-

tion of opinion the counsel for the respective parties agreed on an order postponing the sale indefinitely, until the matter comes up again for final settlement.

Lebanon Springs.—The time set by the Court for the payment of the balance due on the purchase of this road at foreclosure sale expired Aug. 12, but the money ($155,000) was not paid. Under the order of the Court the road will have to be resold.

Manhattan.—This company's statement for the quarter ending June 30 is as follows:

Earnings	$1,773,523
Expenses	914,442
Net earnings	$859,081
Other income	17,284
Total	$876,365
Interest, rentals and taxes	462,431
Surplus	$413,934

The surplus was equivalent to 1.59 per cent. on the stock. No comparison can be made with last year's report, as the earnings of the New York Elevated (Third and Ninth Avenue) lines were then included for only about one-third of the quarter.

Memphis & Charleston.—It is announced that the East Tennessee, Virginia & Georgia Co. has now the control of Memphis & Charleston stock. In addition to the stock held by Messrs. Brice, Thomas and associates, other holdings have been turned in, furnishing more than a majority of the stock, which has been deposited with the Central Trust Co. to the credit of East Tennessee, pending the issue of the Knoxville & Ohio bonds.

Memphis, Selma & Brunswick.—A preliminary survey has been begun for the extension of this road from its present terminus at Holly Springs, Miss., eastward. The old surveyed line will be gone over first, and then a shorter and more direct line will be run.

Mexican Railroad Notes.—A dispatch from the city of Mexico, dated Aug. 13, says: "The Cabinet, after a protracted discussion, has decided on the nature of the reply to be made to the representatives of the railway companies on the question of whether the railways were to be exempted from the operation of the decree of June 22. The Government has decided that no exception shall be made in favor of the railroads, and that the law of June 22 shall be enforced to the letter. Subsidies will not be paid, and not one cent of the customs revenue will be appropriated to the railroads, which will have to submit to the exigencies of the situation. The Government maintains that it owes the railroads nothing except the small amount of subsidy which would have accrued to them since the publication of the decrees, and this amount and that falling due in future months will be included in the Government's floating debt. The Government will not even deliver up the subsidy certificates to the railroads, claiming that the roads have no right to them, and that even if the certificates were still receivable for customs duties the Government would not be obliged to deliver up more than enough to keep the railroads supplied with the amount required to cover their monthly subsidies. The Government objects to the railroads amassing a large amount of certificates and using them as security for loans, and considers that it was lenient to the Central road before in permitting the company to issue debentures with subsidy certificates as security."

Minneapolis, Lyndale & Minnetonka.—Mr. C. A. Pillsbury having bought, as lately noted, a large amount of the bonds of this road, he has also secured a controlling interest in the management. The application for the appointment of a receiver has been withdrawn. The new management will soon begin work on the extension of the Minnetonka line to Hutchinson, Minn., and will also extend the Minnehaha Branch to Fort Snelling and make other improvements.

Minneapolis, Sault Ste. Marie & Atlantic.—The St. Paul *Pioneer-Press* says: "The route of the Minneapolis & Sault Ste. Marie seems to develop as follows: From Bruce across the Central at or near Ogema to the Wisconsin River at the mouth of the same, thence across the Milwaukee, Lake Shore & Western at Pelican Lake or near same through the country south of Forest County, past head of Birch Lake in town 30, range 15 east, and across the Menominee River in township 37, range 21 east. This route was in part laid out by Mr. Willis last spring under the direction of Gen. W. D. Washburn and was found to be through a country rich in soil and timber and of easy grades."

Mt. Pleasant & Atlanta.—This company has filed articles of incorporation to build a railroad from Atlanta, in Cass County, Tex., to Mt. Pleasant, in Titus County, a distance of 50 miles.

Nashville, Chattanooga & St. Louis.—This company makes the following statement for July, the first month of its fiscal year:

	1885.	1884.	Decrease.	P.c.
Earnings	$165,667	$187,475	$21,808	11.7
Expenses	97,546	108,602	11,056	10.2
Net earnings	$68,121	$78,873	$10,752	13.6
Interest and taxes	55,900	57,260	1,360	2.4
Surplus	$12,221	$21,613	$9,392	43.5

The earnings continue to show a considerable decrease, which has not been fully met by the reduction in expenses.

New York Central & Hudson River.—A contract for building the East Lockport Branch has been let to Whitmore & McRae, of Lockport, N. Y. This is a freight branch, intended to reach several large mills.

The storm of Aug. 12 caused a very heavy wash-out on this road near Amsterdam, N. Y., an embankment 60 ft. high having been carried away for nearly 200 ft. The creek where the wash-out occurred is ordinarily a small one, and the water had never before exceeded the capacity of the culvert there. Work on on the break was delayed by continued rain and high water, and it was not until the afternoon of Aug. 14 when one track was completed, and all four tracks were not open until three days later. The break caused heavy loss on account of the delay to traffic, besides the cost of repairing it.

New York, Lake Erie & Western.—This company's reports to the New York Railroad Commission give the following figures for the quarter ending June 30, and the nine months from Oct. 1 to June 30:

	Quarter.		Nine months	
	1885.	1884.	1884-85.	1883-84.
Earnings	$4,402,558	$4,912,366	$13,799,728	$15,887,107
Expenses	3,404,634	3,893,256	10,385,947	12,385,248
Net earnings	$997,924	$1,019,110	$3,413,781	$3,501,859
Other income	294,601	439,932	753,944	921,240
Total	$1,292,525	$1,459,072	$4,167,725	$4,423,099
Interest, rents, etc.	1,937,305	1,800,015	5,426,239	5,446,026
Deficit	$644,780	$340,943	$1,258,514	$1,022,927

The statements include the 68 per cent. of gross earnings of the New York, Pennsylvania & Ohio, and all interest accruing is included in the charges.

New York, Ontario & Western.—It is reported that a controlling interest in this company's stock has been secured by Mr. Vanderbilt, and that the road will hereafter be operated in his interest and in connection with the West Shore line.

New York, Pennsylvania & Ohio.—In Pittsburgh, Aug. 13, an opinion was filed in the United States Circuit Court by Judge Acheson, discharging the Receiver and refusing to remand the case to the state court. "For the proper understanding of the reasons urged in support of the motion to remand this cause," says the Court, "a preliminary statement of facts is given. The Atlantic & Great Western Railway Co., organized under the state laws of New York, Pennsylvania & Ohio, defaulted in payment of interest on its mortgage bonds, and foreclosure suits were commenced in 1874, a receiver being appointed. The allegations in the bill of complaint are that the total bonded debt of the company at that time amounted to nearly $57,000,000, an enormous sum as compared with the property and means of the company, which was destitute of net earnings. At this juncture the bondholders and other creditors and shareholders of the company entered into an agreement for the organization of a new company, to be effected by a sale under the foreclosure suits of the railroad, with the rolling stock, franchise, etc. The administration of the company was to be brought under the direct supervision of the bondholders, who should have full control. The shares of the reconstructed company were to be deposited in trust, and the right to vote thereon vested in five trustees, elected annually, three to be chosen by a majority in value of the second-mortgage bondholders, and one by a majority in value of leased-lines bondholders, their voting trust to continue until the third-mortgage bondholders should receive 7 per cent. interest in cash during three years, certificates in exchange for and representing the deposited shares, and entitled to dividends when declared, to be issued by the trustees.

"The plaintiffs, four in number, are all aliens, except John Ballange Cox, who is a citizen of Pennsylvania. The alien plaintiffs are severally holders of certificates given by the reorganization Trustees in exchange for bonds of the Atlantic & Great Western Railroad Co., which entitle them to receive from the trustees a like number of bonds of the like classes of the defendant company; and one of the alien plaintiffs, viz., James McHenry, is also the holder of certificates to a very large amount given by the trustees, representing shares of the stock of the old company deposited with the trustees." The opinion at length names what was asked of the Court, and the order appointing a receiver, July 11, 1885, is rescinded and the Receiver discharged. The motion to remand the suit was also denied.

New York, West Shore & Buffalo.—The influence of the New York Central on the management of this road is already shown by the restoration of local passenger rates to the old standard of 2 cents per mile, as noted elsewhere.

It is said that the road will continue to be operated independently, and will retain all its connections east and west as heretofore.

It is understood that all the creditors of the North River Construction Co., with one or two exceptions, have agreed to take 50 cents on the dollar for their claims. This will simplify the final settlement of the company's affairs.

Northwest Central.—At a recent meeting the stockholders voted to authorize an issue of $3,000,000 in bonds and also to begin work at once on the section from Brandon to Rapid City in Manitoba.

Northern Pacific.—On the western end of the Cascade Division track has been laid this year from South Prairie Junction, Wash. Ter., east to Green River, 17 miles, and grading is nearly completed for 8 miles further along Green River. On the eastern end of the division, track has been laid from North Yakima west to the Natches River, 2 miles, and grading is in progress for 30 miles further.

It is stated that the construction department is to be closed on Sept. 1, when all work in progress will be turned over to the operating department. The amount of new work in hand is now comparatively small, and hardly requires the organization of a separate department.

The report that the Chicago, Rock Island & Pacific Co. had obtained a controlling interest in this company's stock is pronounced by officers of both companies to be entirely without foundation.

A correspondence between President Harris and Mr. Charles B. Wright has brought out the following statement from Mr. Harris:

"I am in favor of the lease of the Oregon Railway & Navigation property on the terms proposed by the Northern Pacific and Union Pacific companies, jointly, and have twice voted for it in the board. I believe that the lease is for the best interests of the Northern Pacific Railroad Co., and also that it will conserve the interest of all three parties to it by avoiding conflicts and unnecessary waste of money, and by enabling the lessee companies to serve the public in the best manner at the minimum cost. And I shall recommend the stockholders to ratify the action of the board at its meeting, July 23, authorizing the execution of the lease."

Ohio Central.—The committee representing the River Division bondholders gives notice that the period of time within which holders of stock and bonds may join in the reorganization will expire on Oct. 14 next. Securities must be deposited with the Central Trust Co. in New York by that time, and the assessments paid.

Philadelphia & Reading.—Philadelphia dispatches report a movement towards foreclosure, as being now the only possible solution of this company's difficulties. The reorganization Committee, however, held a meeting this week, but took no action whatever looking towards such a course.

Portland & Ogdensburg.—This road was badly damaged in the storm of Aug. 13, serious wash-outs having occurred at North Conway and other points in New Hampshire. The running of trains was interrupted for several days, but a large force was set at work at once, and the road is now in good condition again.

Rochester & Pittsburgh.—It is now stated that the reorganization of this company will be carried through without the necessity of making any assessment on the stock.

St. Louis, Fort Scott & Wichita.—Surveys are being made for an extension of this road from Wichita, Kan., to the west line of Reno County. Some local aid is promised. It is said that grading contracts will be let as soon as the location is completed.

South Pennsylvania.—Nothing new has been made public as to the transfer of this unfinished road to the Pennsylvania Railroad Co. It is stated that Mr. Franklin B. Gowen, who will shortly return from England, will head the opposition to the transfer, and also that application will be made to the Attorney-General of Pennsylvania to take legal action under the clause of the state constitution forbidding the consolidation of parallel and competing lines.

Nearly all the contractors on the road have stopped work, and others are clearing up and making preparations to stop.

Southern Pacific.—This company's statement for its Atlantic system (the lines east of El Paso) shows for June earnings of $602,852 gross and $187,354 net, against $371,196 gross and a deficit of $102 in June, 1884, when traffic was almost stopped by wash-outs. For the six months to June 30 the earnings were $3,993,551 gross and $1,510,749 net this year, against $3,559,249 gross and $943,502 net last year.

Syracuse, Phœnix & Oswego.—Track is now all laid on this raad from Syracuse, N. Y., northward to the junction with the New York, Ontario & Western at Fulton, a distance of 23 miles. The use of the Ontario & Western track from Fulton to Oswego, 12 miles, completes the line. Negotiations are now pending for a lease of the road to the Rome, Watertown & Ogdensburg Co., which will, if the lease is made, have two lines to Syracuse, one from Sandy Creek and one from Oswego.

Tavares, Orlando & Atlantic.—This company has assumed possession of its road, which has hitherto been operated by the contractor, the Tropical Construction Co. The road is completed from Tavares, Fla., where it connects with the road of the Florida Railway & Navigation Co., to Orlando, a distance of 32 miles.

Texas & St. Louis.—The claims against this company filed with the Special Master, at Waco., Tex., amount to $334,000 in all, held by 78 individuals. This does not include the bondholders' claims.

Toledo, Cincinnati & St. Louis.—The Court has authorized the Receiver to increase the train service and to make some improvements on the road. An order has also been made giving the Receiver power to issue the balance of the certificates authorized some time ago. The amount was $150,000, but only $76,000 were disposed of, leaving $74,000 which can now be used. The proceeds are to be used to pay off back wages and other pressing claims.

Union Pacific.—This company issued an order Aug. 12 reducing the number of working hours in its Omaha shops from 10 to 8 hours a day, and cutting down the work on Saturdays to 4 hours. The same reduction is to be made in shops at Kansas City and Denver. There is considerable dissatisfaction among the men, about 1,500 of whom are affected by the order in Omaha. The company claims that it had to retrench, and rather than to discharge a large number of men, it concluded to reduce the number of working hours so that all could have employment. This cut amounts to about 20 per cent.

The earnings of the company's Oregon Short Line for the six months to June 30 were:

	1885.	1884.	Increase.	P. c.
Earnings	$766,525	$355,461	$411,064	115 6
Expenses	573,282	416,763	156,519	37.5
Net earnings	$193,243	$61,302*	$254,545	

* Deficit.

The mileage worked was 611 miles this year, against 596 miles last year, an increase of only 2½ per cent.

At the last meeting of the board President Adams presented the following statement for the six months to June 30:

	1885.	1884.
Earnings	$11,224,530	$10,993,817
Expenses	7,949,844	7,634,093
Net earnings	$3,274,686	$3,359,724
Other income	466,503	553,094
Total	$3,741,389	$3,912,818
Interest, rents, etc.	3,784,018	3,793,058
Surplus or deficit	D. $42,829	S. $119,760
U. S. government requirements	384,292	437,007
Deficit	$427,121	$ 317,247

The government transportation earnings for the first six months of 1885 exceeded the government requirements in the sum of $145,059.

In his statement President Adams says: "During the first half of 1884 the proceeds of the sale of lands belonging to the Kansas Pacific land grant were, under the terms of the consolidated mortgage, paid over to the company and applied by it to the payment of maturing coupons of bonds secured by that mortgage. During the first six months of the current year the greater part of the cash received from these sales was applied by the trustees, at the request of the company, to the purchase and extinguishment of the outstanding bonds. Consolidated mortgage bonds to the par value of $683,000, costing $672,263, were in this way bought and canceled. No part of the proceeds of the land sales has been paid over to the company or applied to the payment of coupons.

"The 30th of June also closed the first entire year since the change of management of June 18, 1884, took place. The following is a condensed statement of the financial results of that year: Total income, $11,680,832; total expenditures, $7,579,923; surplus, $4,100,909; less United States requirements, $1,134,395; net surplus income, $2,966,514.

"The net surplus income represented 4.87 per cent. on the capital stock of the company. * * * * *

"The sinking fund established under the Thurman act now amounts to $5,522,292. The annual interest on the bonds held on June 30, 1885, is $175,599. The net floating debt of the company June 30, 1884, was $7,816,881; Dec. 31, 1884, $4,154,400, and June 30, 1885, $4,704,790.

"In the published statements for June 30 and Dec. 31, 1884, no amount was included as due the United States government under the requirements of the Thurman act. It was then claimed that, upon an account stated, it would be found that the government was indebted to the company, instead of the company to the government. Subsequently, under a decision of the Court of Claims, the company was found to be indebted to the government in the sum of $916,704. This has since been paid. Corrected in the light of this finding of the Court of Claims, the statements of the floating debt for June 30 and Dec. 31, 1884, should have included, in addition to the amounts given in the annual report, the sum of $916,704, as above, making the total gross floating debt at those dates, respectively, $14,026,724 and $12,223,298, and the total net debts $7,816,881 and $4,154,400 respectively.

"From this statement it will be seen that the increase of the gross floating debt during the first half of the present year was $544,900. The increase of the net floating debt was $550,390. During the 12 months ending June 30 the gross floating debt was decreased $1,258,525, and the net floating debt was decreased $3,112,091.

"During the year, the funded debt has been decreased in the sum of $2,067,047. The total decrease of debt, funded and unfunded, has been $720,609 during the six months ended June 30, and $5,179,138 during the year ending at that date.

"During the months of May and June last there was, as compared with the same months in 1884, a large increase in operating expenses amounting to $194,427 in May and $334,340 in June. In order to prevent false inferences being drawn from this increase, and the conse-

quent loss of net earnings, it seems proper to say that it is almost wholly due to the fact that the work of renewing the track, heretofore done during the autumn months, has this year been done during the months of May, June, July and August. During the first six months of the year, for instance, 723,000 ties were put in the track, as compared with 273,000 in 1884 and 404,000 in 1883. During the same months, 67,000 tons of steel rail were charged out this year, as compared with 2,900 in 1884 and 2,600 in 1883. The amount of labor and material other than rails and ties has, of course, been proportionally increased. Last year the work of renewal was done almost wholly after the first of September. The increase of operating expenses, already noticed in May and June, will unquestionably be continued in July and August, causing the returns of those months to compare favorably with the returns of the same months in previous years. Nevertheless, the annual work of renewal will then be done, and the road and motive power will be ready to handle the heavy volume of traffic which always comes during the last six months of the year. The stockholders, therefore, should know in advance that the increased operating expenses, and consequent decreased net earnings during the months from May to August, inclusive of this year, will not necessarily imply any unfavorable results for the year as a whole."

The total land sales for July were 192,188 acres for $459,-811. For the seven months to July 31 the sales were: Union Division, 432,111 acres for $736,850; Kansas Division, 433,433 acres for $1,705,884; total, 865,544 acres for $2,442,734; being a decrease of 1,560,762 acres and $3,-085,575 as compared with last year.

Wabash, St. Louis & Pacific.—A cable dispatch from London, Aug. 11, said: "The Wabash committee have issued an elaborate scheme of reorganization for the approval of the shareholders (not bondholders). The committee express regret that they are unable to present a more satisfactory report, but say that unless a united and determined effort be made to save the property, it will fall to pieces."

Another cablegram from London says the English holders of the bonds have resolved to begin foreclosure proceedings under the terms of the general and collateral mortgages. A purchasing committee was appointed, in which all the property after purchase shall be vested. It is contemplated to form a new corporation, which shall acquire legal possession of the property.

The plan of reorganization above referred to is substantially as follows:

1. Foreclose and reorganize under both mortgages.

2. New company to issue debenture mortgage bonds entitled to 6 per cent. interest, but dependent upon income and not cumulative, of which $3,500,000 shall be preferred bonds, to have voting privilege; whole amount of bonds, $30,000,000.

3. Into these bonds convert general mortgage bonds, $16,-000,000; collateral trust bonds, $6,000,000; collateral trust bonds, indorsed debt preferred bonds, $3,500,000; reserve for stock and bond subscription, $4,000,000; reserve for use of new company, $500,000; total, $30,000,000.

4. The preferred bonds issued for indorsed debt to be redeemable at the option of the company, after 5 years, at any time within 20 years from the date of the mortgage.

5. Issue new preferred and commen stock share for share for old stock, and offer same to old stockholders who will subscribe for the new bonds reserved for that purpose, and at the rate of $8 per share for preferred and $6 per share for common. The holder of 100 shares of preferred stock would thus receive 100 shares of the new preferred stock by subscribing for $800 of the new bonds, and the holder of 100 shares of common stock would receive 100 shares of the new common stock by subscribing for $600 of the new bonds.

6. The holders of new bonds to subscribe for the reserved bonds to an amount not exceeding 2 per cent. of the par value of the amount of bonds issued to them as above indicated. The amount of new bonds to which this subscription would apply is $25,500,000. Two per cent. on this amount will produce $510,000.

7. The cash received from the stock and bond subscription will provide about $4,016,000, as follows: 230,269 shares preferred stock, at $8 per share, $1,842,152; 277,830 shares common stock, at $6 per share, $1,664,280; $25,500,000 new bonds at 2 per cent per share, $510,000; total, 4,016,-432.

8. The new bonds or holders thereof agree to take *pro rata* all stocks in default and pay the subscription thereon, receiving therefore the stocks and bonds appropriated to such defaulting stock.

The organization known as the Knights of Labor ordered a general strike of all its members employed on this road on Aug. 18. A considerable number of men left the shops at Moberly, Mo., and other points, but up to the time of writing the strike had not assumed formidable proportions.

Wilmington & Weldon.—Work on the new Wilson cut-off is progressing well. The grading is finished from Wilson, N. C., to Selma, and is also completed from Smithfield to beyond the Neuse River. Track is reported laid from Smithfield to the river, 2 miles, this section having been finished so that the construction train can carry material for the bridge over the Neuse

Wisconsin Central.—Bids for grading the extension of this road from Schleisengerville, Wis., to Milwaukee and Chicago, were received Aug. 15, but the contracts have not yet been awarded. The specifications required the work to be finished by Feb. 1, 1886. The line will run through Waukesha, and the company's agents are now securing the right of way.

Wisconsin, Iowa & Nebraska.—It is reported that negotiations are in progress for a sale or lease of this road to the Minnesota & Northwestern Co. Officers of the last-named company have been inspecting the road.

ANNUAL REPORTS.

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Panama.

This company owns a line across the Isthmus of Panama from Colon (Aspinwall) to Panama, 48 miles. The report is for the year 1884.

The capital stock is $7,000,000. No statement of the debt is given, but its amount is not large.

The traffic for the year was as follows:

	1884.	1883.	Increase.	P. c.
Passengers carried	515,520	303,979	211,541	69.6
Tons freight carried	287,243	215,725	71,518	33 1

The traffic was largely increased by the transportation of passengers and supplies for the Interoceanic Canal Co.

The earnings for the year were:

	1884.	1883.	Increase.	P. c.
Freight	$2,693,079	$2,051 693	$641,386	31.3
Passengers	443.087	350,665	92,422	26.4
Mail, etc	26,164	21,481	4,683	21.8
Total	$3,162,330	$2,423,839	$738,491	30.5
Expenses	1,743,377	1,121,415	621,962	55.4
Net earnings	$1,418,953	$1,302,424	$116,529	8.9
Gross earnings per mile	65,882	50,497	15.385	30.5
Net " "	29,562	27,134	2,428	8.9
Per cent. of expenses	55.1	46.3	8.8	....

The expenses were increased by large payments for renewals and improvements of road and equipment.

The income account for the year was as follows:

Net earnings, as above		$1,418,953
Miscellaneous receipts		332,446
Total		$1,751,399
Interest	$442,528	
Subsidy, etc	133,048	
Dividends paid	1,120,000	
		1,695,576
Surplus for the year		$55,823

The dividends paid were 16 per cent., against 13½ in 1883 and 12½ per cent. in 1882. The total accumulated surplus at the close of the year amounted to $1,076,557 over all charges and dividend payments.

Little Rock & Fort Smith.

This company owns a line from Little Rock, Ark., to Fort Smith, 165 miles, with 3 miles of branches. The report is for the year 1884.

The equipment includes 13 locomotives; 10 passenger, 1 combination and 3 baggage cars; 158 box, 20 stock, 173 flat and 6 caboose cars; 1 tool car.

The general account is as follows, condensed:

Stock		$4,505,309
Funded debt		2,376.010
Coupon notes		634,725
Accounts and balances		129,124
Income account		801,981
Total		$8,447,149
Road and property	$7,638,017	
Land notes	504,586	
Arkansas state aid bonds	19,012	
Accounts and balances	92,192	
Cash	94,342	
		$8,447,149

The funded debt includes $2,375,500 first mortgage bonds and $510 scrip. The company holds $168,000 additional bonds in the treasury.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	$345,468	$308,380	I. $37,088	12.0
Passengers	188,522	194,342	D. 5.820	3.0
Mail, etc	55,082	70,770	D. 15,688	22.1
Total	$589,072	$573,492	I. $15,580	2.7
Expenses	343,489	335,201	I. 8,288	2.5
Net earnings	$345.583	$238,291	I. $7,292	3.1
Gross earn. per mile	3,506	3,414	I. 92	2.7
Net " "	1,462	1,418	I. 44	3.1
Per cent. of expenses	58.3	58.4	D. 0.1	....

Extensive renewals of rails and ties were made during the year, the new rails being all steel. A number of the freight cars were rebuilt so as to double their capacity.

The Land Department reports 28,095 acres sold for $99,080. These lands were sold at an average of $3.50 per acre, and to 481 buyers, who took an average of 58.4 acres each. The taxes paid on lands were $13,550. The Department held at the close of the year $503,586 in land notes and contracts, and 642,204 acres of unsold lands.

The result of the year was as follows:

Net earnings, as above		$245,583
Land accounts		102,430
Miscellaneous		1,161
Total		$349,174
Interest, taxes, etc	$225,025	
Land expenses	46,167	
		271,192
Surplus for the year		$77.982
Surplus, Jan. 1, 1884		723,999
Balance, Dec. 31, 1884		$801,981

During the year the new bridge of the Little Rock Junction Co. over the Arkansas River was completed, connecting this road with the Little Rock, Mississippi River & Texas road. Work was begun on a new branch from Coal Hill, 115 miles west of Little Rock, to a very promising coal mine, two miles distant.

Chicago, St. Louis & Pittsburgh.

This company owns, as purchaser at foreclosure sale, the lines formerly known as the Columbus, Chicago & Indiana Central, extending from Columbus, O., to Indianapolis, from Bradford Junction to Chicago, and from Richmond, Ind., to Logansport and State Line, 580.5 miles in all. It also uses under contract the Wabash, St. Louis & Pacific track from Indianapolis to Kokomo, 55 miles. The report is for the year 1884.

The company is controlled by the Pennsylvania Railroad Co., and the road is operated in connection with the Pittsburgh, Cincinnati & St. Louis, but under a separate organization.

The equipment includes 190 locomotives; 68 passenger and 40 baggage, mail and express cars; 2,146 box, 670 stock, 754 gondola and 75 cabcose cars; 1 tool car.

The general account, condensed, is as follows:

Common stock		$6,952,543
Preferred stock		17 274 550
Funded debt		17,873,248
Current liabilities, accounts, etc		1.427,033
Total		$43 527,374
Road and equipment	$42,332,091	
Current assets, supplies, cash, etc	1,.54.189	
Profit and loss, debit	41,094	
		$43,527,374

The funded debt includes $12,504,000 coupon and $881,-000 registered consolidated bonds and $4,488,248 sectional bonds of various issues.

The traffic for the year was as follows:

Train-miles:	1884.	1883.	Inc. or Dec.	P. c.
Passenger	1,441,415	1,543,052	D. 101,637	6.6
Freight	3,615.873	4,117,859	D. 501,986	12.2
Other	63,683	141,183	D. 77,500	54.6
Total	5,120.971	5,802,094	D. 681,123	11.7
Pass. car miles	6,67',092	6,654.887	I. 16,205	0.2
Frt car miles	57,085 797	65,072,533	D. 7,986,736	12 3
Passengers car	1,186.779	1,228,701	D. 41,922	3.4
Pass.-miles	48,891,744	48,146.452	I. 745,292	1.6
Tons freight	2,517,062	2.782,033	D. 264,971	9.5
Ton-miles	484,716,894	526,622 269	D. 41,905,375	7.9
Av. train load:				
Passengers, No	34.9	32.1	I. 2.8	8.4
Freight, tons	189.8	176.1	I. 13.7	7.8

The average passenger journey was 41.2 miles; the average freight haul 192.6 miles. The average train was 4.75 passenger or 22.35 freight cars. Of the freight car mileage 22 per cent. was of empty cars.

The average receipt per train-mile and per unit of traffic were, in cents:

	1884.			1883.		
	Receipt.	Cost.	Net	Receipt.	Cost.	Net.
Per train-mile	111.12	91.04	20.08	117.93	96.59	21 34
Per pass.-mile	2 32	2.11	0.21	2.42	2.42	....
Per ton-mile	0.60	0.53	0.07	0.72	0.60	0.12

The average rate on through traffic last year was 0.49 cent per ton-mile, and on local 0.78 cent.

The earnings for the year were:

	1884.	1883.	Inc. or Dec	P. c.
Freight	$2,902.433	$3,781,107	D. $878,674	23.2
Passengers	1,134,689	1,163,407	D. 28,718	2.5
Mail and express	265,079	248,910	I. 16,169	6.5
Rents, etc	94,640	100,496	D. 5,856	5 8
Total	$4.396,841	$5,293,920	D. $897,079	17.0
Expenses	3,602,213	4,335,965	D. 733,752	16.9
Net earnings	$794.628	$957,955	D. $163,327	17.1
Gross earn. per mile	7.574	9.120	D. 1,546	17.0
Net " "	1.367	1,650	D. 283	17.1
Per cent. of exps	81.9	81.9	....	....

Earnings were reduced by the very low rates received on the through traffic, which forms a large part of the business of the road.

The result for the year was as follows:

Net earnings, as above		$794,628
Miscellaneous receipts		80,046
Total		$874,674
Interest on bonds	$980,872	
" " car trusts	98,730	
Rentals paid	21,224	
		1,100,826
Deficit for the year		$226.152
Surplus Jan. 1. 1884		185,058
Debit balance, Dec. 31, 1884		$41,094

There were used in renewals 4,371 tons of steel rails and 238,208 new ties. There were 11 miles of new sidings built, several new bridges repaired, and other improvements made.

The report says: "A large amount of the through traffic controlled by the Erie Railroad Co. and formerly carried on your lines between Chicago and Urbana, the point of connection with their leased New York, Pennsylvania & Ohio Railroad, was diverted from your system and transferred to the Chicago & Atlantic Railway.

"The average rate obtained on freight during the year was 6 mills, against 7.2 mills in the previous year, a decrease of 1.2 mills, or 16.7 per cent. This was due to the severe competition for through traffic, which constituted more than one-half of your total tonnage, upon which the average rate obtained was but 4.9 mills, against 6.4 mills in the previous year.

"While the earnings of your company were so largely reduced by the causes already stated, there was a corresponding reduction in the expenses, so that the ratio of expenses to earnings in 1884 was practically the same as in 1883."

There was expended for betterments and charged to construction account in 1884 the sum of $1,213,335, of which $606,343 was for real estate and $276,657 for right of way.

The report continues: "It will be noted that the principal expenditures were in constructing the new and extensive shops at Indianapolis and the purchase of the necessary machinery therefor, and of right of way and necessary real estate at Chicago, Indianapolis, Richmond and other points which had been formerly held under lease by the Columbus, Chicago & Indiana Central Railway. There was also charged to this account one-half of the amount paid during the year on the cost of 1,926 freight cars heretofore received through the Pennsylvania Car Trust.

"During the past year your capital stock was increased $555,750, of which $382,400 was common stock and $173,-350 preferred stock. This was issued by the Purchasing Committee, together with $49,000 first mortgage consolidated bonds, for the purpose of redeeming sundry obligations and capital stock of the Columbus, Chicago & Indiana Central Railway Co., under the agreement for its reorganization. During the year there have been paid by your company $11,000 preferred first mortgage bonds Columbus & Indianapolis Railroad Co. and $11,000 common first mortgage bonds; $493,-500 first-mortgage bonds Toledo, Logansport & Burlington Railroad Co. and $36,235 income bonds of the same company. There were also issued, in addition to the $49,000 first-mortgage bonds of your company, $838,000 of the same issue of bonds, in payment for certain real estate and right of way at Chicago, Indianapolis and Richmond."